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17. ORTHOPTERA.

1. Dermatoptera

by

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With 1 plate.

The collection of *Dermatoptera* made by Dr. YNGVE SJÖSTEDT in Kilimandjaro and Meru is some respects quite remarkable. It contains fifteen species, representing eleven genera; three of the species are new to science, and probably a fourth, which I refrain from describing, as it is only represented by a solitary female. Excluding a few which it is impossible to name, owing to immaturity or bad condition, the collection consists of 794 specimens, of which no less than 447, or considerably more than half, are all examples of one new species. Of the other two new species, there are 52 and 57 specimens respectively; of two other species which are not new, but hitherto very insufficiently known, there are 93 and 65 specimens each.

Of the remainder, there are one or two specimens of well known and widely distributed forms which call for no remark; there are eleven of *Forficula rodziankoi* SEM., which seems to be rare, and is not well known, and there are 20 specimens of *Spongiphora quadrimaculata* STÅL, and 35 of *Echinosoma wahlbergi* DOHRN, neither of which are numerous in collections and museums.

There are only two cases which are poorly represented, but yet of such interest that it is to be regretted that specimens are not more numerous; one of these is a single female of what is certainly a new species of *Pseudochelidura*, and the other case is that of *Pygidicrana bettoni* KIRBY, of which there are two females and a very young larva; this species is probably not rare, but it has been only comparatively recently discoved and is not yet generally known.

We may arrange the species known to occur in the region of Kilimandjaro and Meru as follows:

A. Universally distributed Species.

Chelisoches morio FABR. — *Anisolabis annulipes* LUC.

Apterygida arachidis YERS.

B. Species widely distributed through Africa.

Echinosoma wahlbergi DOHRN.
Spongiphora quadrimaculata STÅL.
Diaperasticus erythrocephalus OLIV.
Forficula senegalensis SERV.

C. Species probably occurring widely in East Africa.

Pygidicrana bettoni KIRBY.
Diaperasticus sansibaricus KARSCH.
Forficula rodziankoi SEM.
Chactospania rodens n.

D. Species probably precinctive, i. e., confined to the district in question.

Anisolabis laeta GERST.
Anisolabis felix n.
Forficula sjöstedti n.
Pseudochelidura sp.
Bormansia africana VERH.
Bormansia impressicollis VERH.
Leptisolabis usambarana VERH.
Leptisolabis theoriae VERH.

These four last species were not captured by Dr. SJÖSTEDT.

It is worthy of note that all these precinctive species are incapable of flight.

Our knowledge of the *Dermatoptera*-fauna of the country round Kilimandjaro and Meru has been hitherto very meagre. GERSTÆCKER published an account of the insects of the neighbourhood of Zanzibar, in 1869 (Arch. für Naturg. 1), based on material accumulated by VAN DER DECKEN, in which he described two species of earwigs; one of these is *Anisolabis laeta*, which was taken in numbers by Dr. SJÖSTEDT, and the other *Forficula* (*Apterygida*) *gravidula*, which is synonymous with *A. arachidis* YERS., and is now universally distributed throughout the world.

Apart from this paper, I know of no article dealing with the subject, and in order to find any notes supplementary to the material obtained by Dr. SJÖSTEDT, it has been necessary to search for references to this district scattered through the literature of this group of insects.

The remarkable genus *Bormansia* was not found by Dr. SJÖSTEDT; it contains two species which occur in East Africa. *B. africana* VERH. was taken by OSCAR NEUMANN in German East Africa, but the author gives no more precise locality; *B. impressicollis* VERH. was found at Taita by HILDEBRANDT, who brought home a solitary female, and I have several specimens, including males, from Kilimandjaro in my own collection, bought from a German dealer.

Pygidicrana caffra DOHRN is described from specimens found at Zanzibar by HILDEBRANDT (teste KARSCH op. cit.) and is probably widely distributed through Eastern and South-eastern Africa.

The wingless genus *Leptisolabis* VERH. (Sitzungsbericht der Ges. Naturf.-Freunde, 1901, No. I. p. 12), contains two species, *L. usambarana* VERH., known from a single male taken by KONRADT at an elevation of 850 metres in December 1891, at Derema in Usambara, and *L. theoriae* VERH., represented in European collections by two males in the Berlin

Museum, from Mikindani in German East Africa; both these species may occur in the region round Kilimandjaro.

In my collection I have a single male of an apparently undescribed species of *Pygidicrana* from Manou in German East Africa, which probably extends its distribution to the district in question.

Labia marginalis THUNB. (*ochropus* STÅL) is recorded from various scattered localities in Africa, and probably occurs also in the neighbourhood of Kilimandjaro.

It is worthy of not that although Dr. SJÖSTEDT has brought home such interesting forms in such numbers, his collection includes no specimens of either *Leptisolabis* nor *Bormansia*, which is to be regeretted, as with one exception they are only known from the descriptions of VERHOEFF, which is far from being sufficient, more especially as no drawings of them have as yet been published.

It is also noteworthy that Dr. SJÖSTEDT's collection is unique in one respect; he it includes no specimens of *Labidura riparia*, but a single larva of *Apterygida arachidis*, and of *Anisolabis annulipes* there are seven specimens of a distinct race, which may possibly deserve specific rank. In most collections, from any country, these species easily out number all others.

There are also various mountain forms, at present little known, from Abyssinia; perhaps some of these may extend their range as far south as the Alpine regions of Central Africa.

Gen. **Pygidicrana** SERVILLE.

Ann. Sci. nat. XXII, p. 30, 1831.

Pygidicrana bettoni KIRBY.

Ann. Mag. N. H. (7) XI, p. 61, 1903.

Kilimandjaro: Kibonoto, cultivated zone, 1,300—1,900 m., 17. II. 05, 2 females.

Pl. 1, fig. 1. This species was first taken at Samburu and Voi, in British East Africa, by Mr. C. S. BETTON, whose specimens are in the British Museum, with also an immature specimen from Nyassa. It is probably widely distributed, through perhaps not numerous, through central East Africa.

Gen. **Echinosoma** SERVILLE.

Orth. p. 34, 1839.

Echinosoma wahlbergi DOHRN.

Stett. ent. Zeit. XXIV, p. 64, 1863.

Kilimandjaro: Kibonoto. 25. VII. 05. 6 males, 13 females and 9 larvae; 1,300—1,900 m. also 1. III., 2 males and 4 females.

Meru-Niederung: River Ngare na nyuki. 23. XI., one male.

Pl. 1, fig. 2. These specimens are remarkably fine, the males being 16 mm. long, as compared with 12 mm., the length quoted by DE BORMANS for specimens from southern Africa and Zanzibar; it also occurs on the West Coast, and is recorded from Fernando Po.

Gen. **Anisolabis** FIEBER.

In Lotos, III. p. 257, 1853.

Anisolabis laeta GERST.

In Arch. f. Naturg., XXXV. p. 221 (1869).

Kilimandjaro: Kibonoto. 31 males, 39 females and 22 larvae. August to November. Some taken under dead Banana leaves. One male from Kibonoto (12. IV. 06) was taken in a nest of *Termes goliath* SJÖST., with a smaller species of Termes *Termes vadschaggae* SJÖST. n. sp. on the walls.

Pl. 1, fig. 3. This species was discovered by Dr. KERSTEN, who took a single female on November 30th, 1862 at an elevation of 8,000 ft. (about 3,200 m.) on Kilimandjaro; it was described and figured by GERSTAECKER (l. c.) in his work upon the results of VAN DER DECKEN's travels in East Africa. Since then it has not been recorded. A somewhat similar species was taken by Fea in Tenasserim, and recorded by DE BORMANS as *A. laeta*, but KIRBY has shown this to be quite distinct.

The male closely resembles the female; it is of the same size (14—16 mm.), the dimensions given by DE BORMANS (Tierreich. Forf. p. 46, 1900), (28 mm.) being those of *A. dubronii*, the totally distinct species from Tenasserim, confused by DE BORMANS with *A. laeta*, but separated by KIRBY. The forceps of the male hardly differ from those of the female; they are slightly more slender and more curved, the right branch particularly being more strongly curved at the apex, so that it distinctly overlaps the left branch; the most notable character is the form of the sides of the dorsal plates of the abdomen; when seen from the side, these plates are convex posteriorly, that is, their posterior border is not vertical but produced into an angle pointing posteriorly and this angle is more acute in the apical segments; each segment is also provided with a small but quite distinct horizontal carina which runs along to the apex of the convex portion. This structure is seen to a certain extent in *A. felix* n., which is described later.

Anisolabis annulipes LUCAS.

Ann. Soc. ent. Fr. ser. 2. v. Bull. 841, 1847.

Kilimandjaro: Kibonoto. 1,300—1,900 m. 2 males and 5 females, which all seem to belong to this species; in the ringed feet and antennae, and general appearance they agree, but differ in build; they are longer and more slender than any true *L. annulipes* that I have examined, and the forceps are more slender and longer; they are perhaps a local race of this universally distributed species.

Anisolabis felix n. sp.

(Pl. 1, fig. 4.)

Statura majore; colore atro; caput rufum; antennae fusco-testaceae; elytra nulla; pronotum lateribus sat reflexis; pedes testacei; abdomen glabrum, laeve; segmenta

abdominis lateribus convexis, et apicalibus rugulosis; pygidium brevissimum, obtusum; forcipis braechia maris basi triquetra et fortiter dentata; dehinc attenuata, braechio sinistro sensim, dextro fortiter et angulatim, incurva; feminæ triquetra, subsinuata, margine interno crenulato.

Long. corporis ...	16—19,5 mm. ...	19—22 mm.
» forcipis ...	3—3,5 » ...	4 »

Stout, and fairly large; smooth and shining, jet black except the red head and yellow feet.

Antennae dirty testaceous, paler at the base, then darker, with 20 segments, all pubescent; 3 is long and cylindrical, 4 and 5 together equalling 3 in length, nearly cylindrical; the rest lengthening, cylindrical.

Head clear brick-red, the mouth-parts darker, or nearly black.

Pronotum broadened posteriorly, the margins straight but posterior angles rounded, lateral borders almost concave as the margin itself is turned up, thus making a small triangular depression; the disc is flat and smooth.

Meso- and metanota smooth, and ample.

Feet clear testaceous.

Abdomen smooth, dull black, the last 3 segments somewhat rugulose; seen from the side, the segments are convex, the convexity being more apparent in each segment towards the apex of the abdomen; in the last four segments, the sides are also rugulose. Ventral segments smooth.

The last abdominal segment in the male is large and quadrate, but distinctly broader than long, with a faint median depression, and finely rugulose, the pattern being formed by rows of shallow and very small punctulations.

Penultimate ventral segment of the male is ample, quadrate and rugulose.

Last dorsal segment of the female resembles that of the male, but is somewhat narrower apically.

Pygidium in both sexes is only a fold in the chitin between the forceps.

Forceps of the male with the branches stout and triquetre at the base, where there is a strong depressed tooth on the inner margin; the two branches are curved differently, as in the typical species; the left branch is gently curved inwards throughout its length; the right branch is suddenly bent inwards at an almost acute angle before half its length and after this bend quite straight; the branches are attenuate after the basal third and unarmed after the base.

In the female the branches are triquetre and stout, attenuate about half way down, contiguous, denticulate on the inner margin und subsinuate.

The larvae are quite different from the adult insect; the head is dull black like the rest of the body; the feet are dirty yellow, with a distinct fuscous ring; the build is more slender and the forceps are more slender unarmed and nearly straight.

Kilimandjaro: Kiboscho. »Im obersten Teil des Gürtelwaldes an der Grenze

zu den Bergwiesen; ca. 3,000 m., unter Moos auf Bäumen.» II. 06. 18 males, 17 females, and 22 immature specimens.

This is a very distinct species; in the black body and read head it resembles *A. laeta* GERST., but is considerably larger and the characteristic forceps easily distinguish it; it resembles that species in having the sides of she dorsal abdominal plates terminating in a convexity towards the apex of the abdomen, but this convexity is less pronounced than in that species, and instead of being furnished with one horizontal carina, the sides of these rings are rugulose.

The forceps are bent as in the typical species of the genus, *A. maritima*, but the bend is much more abrupt; the shape of the forceps and the tooth near the base recall *A brunneri*, from Australia, but in that species the coloration is different, the basal tooth of the forceps is blunt, not sharp, and the branches are bent and not abruptly angled.

It is undoubtly allied to a hitherto undescribed species from Nyassa, in my collection, of which I append the description for purposes of comparison.

It also resembles *A rufescens* KIRBY, from West Africa, but the coloration is different and the forceps are not the same.

Anisolabis infelix n. sp.

Statura majore; colore nigro; capite fusco-castaneo; antennae segmentis 4 et 2 brevibus, conicis, ceteris conico-cylindricis; pro-, meso- et metanota punctulata; abdomen glabrum, minute punctulatum; ♂ segmentis apicalibus lateribus convexis et rugulosis; forcipis bracchia subcontigua, valida, apice attenuata et incurva.

	♂	♀
Long. corporis ...	20 mm.	21 mm.
» forcipis ...	3 »	4,5 »

Large; deep black, head dark reddish chestnut.

Antennae with (?) segments, deep reddish black; 3 not so long as in other species; 4 and 5 together equal in length to 3, conical; the rest longer, passing from conical to cylindrical.

Head smooth, deep chestnut, almost black.

Pronotum subquadrate, punctulate, slightly broader posteriorly than anteriorly, the lateral margins exceedingly narrowly reflexed and reddish.

Meso- and metanotum ample, flat, deep dull black, and punctulate.

Feet dirty yellow, with yellow pubescence; femora and tibiae rather short.

Abdomen dark reddish black, entirely punctulate; in the ♂ dorsal segments at the sides gently convex in the basal segments, distinctly convex in the apical segments; the convex part distinctly rugulose in the apical segments.

Venter shining, much more finely punctulate.

Last dorsal segment, ample, subquadrate, with rows of exceedingly minute punctulations.

Forceps with the branches short, very stout, and triquetre at the base, nearly contiguous, gently curved inwards and upwards, attenuate apically, not toothed.

Hab:—NYASSA (one pair in my collection, brought from a German dealer).

I describe this species here in order to compare it with the allied species from Kilimandjaro; in the structure of the sides of the apical dorsal abdominal segments it approaches *A. laeta*, as also somewhat in the shape of the forceps, but it is much larger and of a stouter build. The female resembles the male in every respect except that the convexity of the sides of the abdominal segments is far less pronounced, and they are less rugulose; is also the case in *A. laeta*.

Gen. **Chætospania** Karsch.

Berl. ent. Zeit. XXX, p. 87. 1886.

Chætospania rodens n. sp.

(Pl. 1, fig. 5.)

Caput, pronotum, elytra, alae atra; pedes, abdomen forceps rubra; pygidium maris breve, obtusum, triangulare, apice margine depresso, lobulo subquadrato depresso instructo; pygidium feminae breve, subquadratum, inerme; forcipis brachia elongata, depressa, fere recta; maris margine interno basi fortiter dentata, dente secundo in tertia parte apicali sito, dehinc denticulato, apice incurva; feminae dente basali obtuso, in dimidio apicali denticulata, et subincrassata.

Long. corporis ...	7—10 mm. ...	7—9 mm.
» forcipis ...	2—3,5 » ...	1,75—3 »

Antennae dark testaceous, with 12 segments, the second very small and short, the rest gradually lengthening, all cylindrical.

Head smooth, black, the hinder margin slightly emarginate.

Pronotum subquadrate, anterior border convex, the posterior gently rounded, the sides parallel; prozona somewhat tumid, metazona depressed, with a faint median carina.

Elytra flattened, black, covered with very fine and minute punctulations, not very dense; the lateral borders clothed with short stiff bristles.

Wings long, black, of the same texture as the elytra.

Feet clear yellowish, with fine yellowisch pubescence; the femora not notably short nor very much incrassate.

Abdomen red, blackish at the base, with the lateral tubercles fairly distinct; finely and densely punctulate above; the venter more coarsely punctulate; the first four ventral segments are paler in colour and less densely punctulate than the others.

Pygidium of the male short, in the form of a blunt and stumpy triangle, thick at the base and depressed as well as narrowed; the apex is depressed into a very small flattened lobe, on the edge of which three very minute tubercles are just distinguishable with a strong glass; in the female the pygidium is short and nearly square, not narrowed, nor depressed and quite smooth.

The forceps of the two sexes have the branches elongate, nearly straight, incurved at the apex itself, and very distinctly flattened, of a deep red colour; at the base itself on the lower side of the inner margin there is a strong but blunt tooth in both sexes; in the male the inner margin is smooth beyond this tooth to about the second third of their length where there is a sharp tooth; beyond this tooth the margin is denticulated; in the female, the inner margin is smooth in the first third, and then somewhat incrassate and denticulate to the apex. The forceps are clothed with a long fine pale pubescence in both sexes.

Kilimandjaro: Kibonoto (cultivated zone) under dead leaves of banana and between the sheaths of *Papyrus*, 1,300—1,900 metres, 20 males, 27 females and

5 immature; 6.—20. IX. 05, 3. X. 05, 1.—3. XI. 05, 30. XII. 05, and 12. IV. 06. One from a rest of *Termes goliath*.

Of those which are dated, the most numerous appear to have been taken from September to November; in April, a solitary male.

This species has a distinct resemblance to *Ch. feae*, *Ch. confusa* and the other red and black species, but the stumpy triangular form of the pygidium is distinctive; the three little points at the end are so minute as to be scarcely visible.

Gen. **Spongiphora** SERVILLE.

Ann. Aci. nat. XXII. p. 31, 1831.

Spongiphora quadrimaculata STÅL.

Öfv. Vet. Ak. Förh. XII. p. 348, 1855.

Kilimandjaro: Kibonoto. 4 males, 12 females and 4 larvae. XI. 05.

Pl. 1, fig. 6. This species is probably widely distributed in Africa; it is recorded from Natal and Cape Colony, and there are specimens from Fernando Po in the Paris Museum and in my own collection.

Gen. **Chelisoches** SCUDDER.

Proc. Boston Soc. N. H. XVIII. p. 292, 1876.

Chelisoches morio FABR.

Syst. Ent. 270, 1775.

Usambara: Tanga, one male. Not yet recorded from the interior of Africa; it is universally distributed through the islands of the Pacific and is frequently taken on the east coast of Africa, but it is probably not indigenous on that continent.

Gen. **Diaperasticus** BURR.

Tr. ent. Soc. London 1907, p. 98.

Diaperasticus erythrocephalus OLIV. (nec. FABR.).

Enc. Méth. VI. p. 468, 1791.

Usambara: Tanga, one male. This species is common throughout tropical Africa, including Madagascar, and is always represented by numerous specimens in all collections.

Diaperasticus sansibarica KARSCH.

Berl. ent. Zeit. XXX. p. 90, pl. 3. fig. 8, 1886.

Apterygida mackinderi BURR. Ann. Mag. N. H. (7) VI. p. 83. pl. IV. fig. 3, 3a, 1900.

Kilimandjaro: Kibonoto, 24 males, 35 females and six larvae, in September, between the sheaths of the *Papyrus*.

The insect described by KARSCH was taken at Zanzibar (a single specimen) by J. M. HILDEBRANDT; a few specimens were known to exist in museums and collections.

The type of *A. mackinderi* BURR was taken by Mr. H. J. MACKINDER in July 1899 at Nairobi, about 5,500 ft, in the Kikuyu country, in British East Afrika; in appearance it is very different from what appears to be the typical form described by KARSCH; but Dr. SJÖSTEDT has brought home such a good series that I have been able to examine a large number of specimens, and I can find no structural difference, and so feel obliged to sink the name *mackinderi* as a synonym; it may however be conveniently employed to denote the larger and paler coloured specimens, which seem at first so different; but the two form pass insensibly into one another, and of the specimens brought home by Dr. SJÖSTEDT I have been unable to draw the line where the small dark form begins and the large paler form ends. There are specimens in the British Museum and my collection which have the elytra almost black; these are from Port Natal; in those taken by BETTON in British East Africa (Mbuyuni), they are uniform deep chestnut, as they are in many of Dr. SJÖSTEDT's specimens, while in others they are chestnut in the centre, bordered with dark brown; the two forms appear to occur together, as there are specimens of both varieties noted by Dr. SJÖSTEDT from the same locality at the same date.

Gen. **Apterygida** WESTWOOD.

Introd. Mod. Class. Ins. II. p. 44, 1840.

Apterygida arachidis YERS.

Ann. Soc. ent. Fr. (3) VIII. p. 509, figg. 33—35, 1860.

Kilimandjaro: Kibonoto, 25. VII. 05. This is a cosmopolitan species, having been distributed almost throughout the world by commerce and ships. It has been previously recorded by GERSTAECKER from the district of Mombasa, unter the name of *Forficula* (*Apterygida*) *gravidula* (Arch. f. Naturg. XXV. (1) p. 221, 1869.

It will probably be removed from this genus, but I retain here at least provisionally for the sake of convenience.

Gen. **Forficula** LINNAEUS.

Syst. Nat. ed. X, vol. 1, p. 423, 1758.

Forficula senegalensis SERVILLE.

Orth. p. 39, 1839.

Meru-Niederung, Ngare na nyuki, 2 males. Widely distributed through Africa, from Senegal to Kordofan, from the Sudan to Cape Colony, but variable in coloring and the form of the forceps; perhaps it will be shown to really consist of two species confused together.

Forficula rodziankoi SEMENOV.

Rev. russe d'Ent. p. 48, 1901.

Meru-Niederung, west from the mountain, 27. XII., 3 male, 4 females.

Kilimandjaro: Kibonoto, 1,300—1,900 m. under dead leaves of banana etc., 2 males and 2 females.

Pl. 1, fig. 7. Originally described by SEMENOV from Harar; I have a specimen from Kilimandjaro labelled »BORNEMISZA» and in the Paris Museum there are specimens from Abyssinia; probably it occurs in all the mountains of East Africa up to about 2,000 feet, where it is apparently replaced by the following species.

Forficula sjöstedti n. sp.
(Pl. 1, fig. 8.)

Statura mediocri, minus fortiori; antennae 12-segmentatae; segmenta subconica, fusco-testacea; caput laeve; pronotum sublatius quam longius, postice rotundatum; elytra brevia, unicoloria; alae abortivae; pedes testacei; abdomen typicum, fusco-testaceum castaneum, minutissime punctulatum; segmentum ultimum rectangulare, punctulatum: pygidium ♂ elongato-productum, linguaeforme, angustum, apice attenuatum et obtusum; ♀ breve, angustatum, apice truncatum: forcipis ♂ bracchia gracilia, per tertiam partem basalem margine interno deplanato ac dilatato, margine ipso crenulato, hac parte dente parvo obtuso terminata; dehinc attenuata, inermia, arcuata: ♀ recta, simplicia.

	♂	♀
Long. corporis	8,5—9,75 mm.	8,5—9 mm.
» forcipis	3,5—6 »	1,75—2 »

Stature moderate, slender.

Colour dark chestnut; elytra and feet dirty testaceous.

Head dark chestnut, merging into black, smooth and shining.

Antennae dirty testaceous, somewhat paler near the base; with twelve segments which are somewhat short and subconical.

Pronotum slightly broader than long; anterior and lateral margins straight; posterior margin rounded; smooth, dirty testaceous.

Elytra rather short, smooth and leathery; dirty testaceous; posterior border obliquely truncate, so that the elytra are shorter along the suture than on the external margin.

Wings abortive.

Feet testaceous, typical; the lobes of the second tarsal segment large.

Abdomen typical, dark chesnut, almost black, covered with exceedingly fine punctulations; lateral tubercles on segments 3 and 4 small but distinct.

Last dosal segment transverse, rectangular, very finely punctuate; posterior margin straight, incrassate in the middle; in the female, attenuate posteriorly.

Pygidium ♂ tongue-shaped, elongate, narrowed towards the apex which is narrow, but not pointed. In the ♀ short narrowed, but truncate apically.

Forceps ♂ with the branches in the basal third not themselves deplanate, but the inner border is dilated and deplanate; along the external margin, the convexity is apparent; the dilated part is excavate inside at the base, to admit the long pygidium; the inner margin of the dilated part is quite straight, crenulate and terminated by a short blunt tooth, situate rather on the underside; externally the

branches are sinuate even in the basal third, giving the appearance of a slight waist or constriction. The apical part of the forceps is slender, unarmed and gracefully curved to include an elliptical area.

In the female the branches are short, slender, straight and simple.

Kilimandjaro: Kiboscho in the »Bergwiesen», at 3,000—3,700 m., in the »*Ericinella*-Formation», in dead flowers of *Lobelia deckeni* (over 100 specimens).

Kilimandjaro: Kiboscho, 3,—4,000 m., February 1906, at the highest parts of the limits of the vegetation. (Several hundred specimens.) Also a few under moss, on trees etc., in the very highest parts of she woods which encircle the mountain at 3,000 m. Most of the specimens are from the treeless »Bergwiesen».

Meru: On the highest part of the mountain, about 4,000—4,3000 m., 21.—27. XII. 05, one male of the form *macrolabia*.

There are altogether 449 specimens, of which 31 are of the macrolabia form of male, 97 of the typical form of male, 226 females, and 93 immature specimens; there are two males having one branch of the forceps atrophied, thus presenting a superficial appearance of gynandromorphism.

One pair from Kibonoto, 2,000—3,000 metres; (»Regenwald») is slightly different from the specimens from the higher altitude, but I can find nothing justifying specific rank; they are darker in colour, which may be due to the fact that this pair was received dry and pinned, wheras the others came in alcohol, the sculpture of the body is a little more marked, and the forceps of the male a trifle straighter, and the head and feet more reddish in colour. This is probably a representative of a local variation, on the borders of its distribution.

Of this species, Dr. SJÖSTEDT writes me: ». . . sie war an den höchsten Teilen des Berges, auf den Bergwiesen, sehr gemein, sowohl unter Steinen als besonders in den grossen, trockenen Blumenständen der *Lobelia deckeni*. Solche wurden massenhaft abgebrochen und zwischen den Händen über Zeitungen zermalmt, wobei eine Menge Insekten, auch solche Arten, die ich sonst nie sah, gefunden worden. Obgleich diese hochalpine Gegende selbstverständlich an Insekten ziemlich arm sind, konnte ich bei meiner Fahrt von dort 6—7,000 Stücke mitbringen».

In build and appearance, it looks more like a European than an African earwig, as would be expected from its elevated habitat; it appears to be related to *F. æolica* and *F. caucasica*, neither of which, however, are known to me except from their descriptions.

That a peculiar species of earwig should be confined to one montain is not by any means remarkable; in Europe, we find the genus *Chelidura* (*sensu antiquo*) distributed over the mountain districts, but there is always a distinct species for each group of mountains; thus we have *Pseudochelidura anal is* RAMBUR, in the Sierra Nevada, *Mesochelidura bolivari* BORM., in the mountains of central Spain, the Sierras of Guadarrama and of Peñalara; *Pseudochelidura sinuata* GERM., and *Chelidura pyrenaica* GÉNÉ., in the eastern and western Pyrenees respectively; *Pseudochelidura edentula* WOLL., in the island of Madeira, with *Ps. schmitzzi* BORELLI; *Ps. orsinii* GÉNÉ.,

in the Apennines, *Chelidura aptera* CHARP., in the southern Alps, *Chelidurella mutica* KR., in the Tirol, and *C. acanthopygia* GÉNÉ., in the hills of north central Europe.

F. sjöstedti is more graceful and slender in build than the above insects, but is of the same colour, and like them, is incapable of flight.

Gen. **Pseudochelidura** VERHOEFF.

Zool. Anz. No. 665, p. 196. 1902.

sp. Kibonoto, 1,800—1,900 m., one female. It is unfortunate that no male of this species was brought to Europe; it is impossible to determine its true position from a single female, but it is undoubtedly a new species as the distribution of these flightless forms is always very restricted, and no species of *Pseudochelidura* has yet been described from this part of Africa.[1] In appearance is resembles *P. edentula* WOLL., but I refrain from describing and naming it until further material is available.

List of Species of Dermatoptera hitherto known from the Kilimandjaro-Meru District.

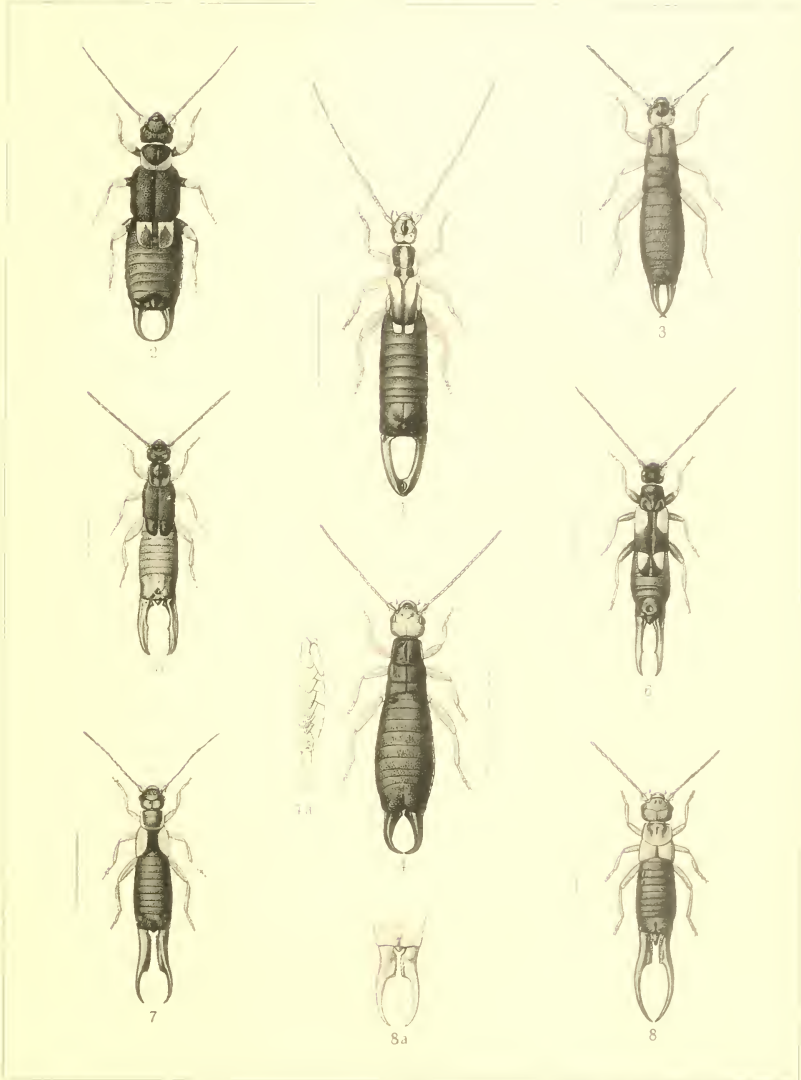
1. Pygidicrana bettoni KIRBY.
2. Echinosoma wahlbergi DOHRN.
3. Bormansia africana VERH.
4. Bormansia impressicollis VERH.
5. Anisolabis laeta GERST.
6. Anisolabis annulipes LUC.
7. Anisolabis felix BURR. n. sp.
8. Leptisolabis usambarana VERH.
9. Leptisolabis theoriae VERH.
10. Chaetospania rodeus BURR. n. sp.
11. Spongiphora quadrimaculata STÅL.
12. Chelisoches morio FABR.
13. Diaperasticus erythrocephalus OLIV.
14. Diaperasticus sansibaricus KARSCH.
15. Apterygida arachidis YERS.
16. Forficula senegalensis SERV.
17. Forficula rodziankoi SEM.
18. Forficula sjöstedti BURR. n. sp.
19. Pseudochelidura sp.

[1] Since the above was written BORELLI has described under the name of *Apterygida cavalli* a flightless form that may be referable to this genus. (v. Boll. Mus. Torino. XXI. N:o 541 from the Ruwenzori district taken by the Duke of the Abruzzi).

PLATE I.

Plate 1.

1. Pygidicrana bettoni KIRB. ♂
2. Echinosoma wahlbergi DOHRN. ♂
3. Anisolabis læta GERST. ♂
4. » felix BURR. n. sp. ♂
4 a. » » abdomen a latere visum.
5. Chætospania rodens BURR. n. sp. ♂
6. Spongiphora quadrimaculata STÅL. ♂
7. Forficula rodziankoi SEM. ♂
8. » sjöstedti BURR. n. sp. ♂; marolabia form.
8 a. » » » » » forceps.



H. Knight delin.

Lith. Instit. Gesellschaft, Stuttgart

Burr: Dermatoptera.

WISSENSCHAFTLICHE ERGEBNISSE

DER SCHWEDISCHEN ZOOLOGISCHEN EXPEDITION

NACH

DEM KILIMANDJARO, DEM MERU

UND

DEN UMGEBENDEN MASSAISTEPPEN

DEUTSCH-OSTAFRIKAS

1905—1906

UNTER LEITUNG VON

PROF. DR. YNGVE SJÖSTEDT

HERAUSGEGEBEN VON DER KÖNIGL. SCHWEDISCHEN AKADEMIE DER WISSENSCHAFTEN

17.

ORTHOPTERA.

2. BLATTODEA

BY

R. SHELFORD

WITH 2 PLATES

UPPSALA 1907
ALMQVIST & WIKSELLS BOKTRYCKERI-A. B.

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17. ORTHOPTERA.

2. Blattodea

by

R. SHELFORD.

With 2 plates.

The number of species of *Blattodea* previously recorded from the region traversed by Dr. YNGVE SJÖSTEDT's expedition is quite insignificant. GERSTÆCKER described in 1869 the collection of insects made by Baron C. C. VON DER DECKEN in the Kilimandjaro district, but scarcely more than a dozen of these were cockroaches. A few species from Mombasa and adjacent localities on the East African coast have been described from time to time by various authors, but in the absence of really representative collections no general review of the East African Blattid fauna has been possible, as in the case of South Africa, Abyssinia, Madagascar, the Cameroons and Angola. This group of insects is usually much neglected by collectors, but this reproach cannot be laid to Dr. SJÖSTEDT's charge, for his collection is a very considerable one, including fifty-one species — about 677 specimens — many of which are represented by long series of individuals of both sexes; in fact the collection may be safely regarded as thoroughly representative of the region in which it was made. The species are referable to 29 genera, four of which are new to science, and of the 51 species, 26 or more than half, are new. In the following account of the collection the species are enumerated and described, species recorded by other authors from the same region — which may be conveniently defined as lying between the equator and 5°S. and between the 35th and 40th parallels of longitude — are also noted and finally an analysis of this Blattid fauna and its comparison with the corresponding faunas of other regions of Africa is attempted.

Fam. **Ectobiidæ.**

Gen. **Theganopteryx** Br.

Theganopteryx africana Sauss.

Ectobia africana Saussure, Abh. Senckenb. Ges. vol. 21 p. 569 (1899)

Kilimandjaro: Kibonoto 1000—1300 metres (April); Lower *Meru:* Masai steppes; *Usambara:* Mombo (June); 9 ♂♂, 4 ♀♀.

Previously recorded from the East African coast (Voeltzkow); the species superficially resembles very closely *Ectobius perspicillaris* Herbst, but structurally differs in the separation of the radial and ulnar veins of the tegmina; since this is the very character used to divide the genus *Theganopteryx* from the genus *Ectobius* the placing of the species in the latter genus is quite illogical.

Theganopteryx saussurei Shelf.

Theganopteryx saussurei Shelford, Gen. Insect. Fasc. 55. p. 8 (1907).
Theganopteryx senegalensis var. Saussure, Ann. Mus. Civ. Gen. Vol. 35 p. 3 (1895).

Kilimandjaro: Kibonoto 1300—1900 metres; Lower *Meru:* Masai steppes. 8 ♂♂.

The species is undoubtedly very closely allied to the West African *senegalensis* Sauss. and may possibly be shown later to be identical; at present however I consider it advisable to separate them.

The two East African species may be separated by their colouration.

1. Testaceous, with scattered fuscous points *africana* Sauss.
1'. Fuscous, pronotum & tegmina margined with white *saussurei* Shelf.

Gen. **Mallotoblatta** Saussure & Zehntner.

Mallotoblatta kraussi Adel.

(Plate 3, fig. 3.)

Mallotoblatta Kraussi Adelung, Ann. Mus. Acad. Imp. des Sci. S:t Petersburg vol. IX. p. 12 (1905).

♂. Flavo-testaceous. Body with a sparse erect pubescence most marked on the ventral surface. A transverse band on the frons, the apex of the maxillary palpi and the labrum fuscous. Vertex of head not covered by pronotum. Pronotum trapezoidal, with two longitudinal fuscous vittae. Tegmina equal to the body in length, 15 costal veins, radial vein bifurcate, 7 longitudinal discoidal sectors, posterior ulnar simple. Wings shorter than the tegmina, mediastinal vein 5-ramose, 9—10 costals, these and the mediastinal rami incrassated, radial vein bifurcate near apex, median vein sinuate, ulnar vein bifurcate near apex, medio-discal and medio-ulnar areas

crossed by transverse nervules, a small triangular apical field. 7th abdominal tergite depressed, its posterior border emarginate, the scent-glands opening at the bottom of the depression, 8th tergite widely emarginate posteriorly, 9th tergite exposed. Supra-anal lamina large, quadrate, posterior angles acute. Cerci elongate. Sub-genital lamina asymmetrical, produced. Front femora with several spines on the anterior margin beneath, the distal ones minute, formula of apical spines ‡, †, ‡, no genicular spines on the front femora.

Length of body 12 mm; length of tegmina 9,5 mm, pronotum 3 mm × 3,9 mm.

Meru: Rain forest 3,000 m., 1 ♀ (January).

I belive this to be the male of ADELUNG's species described from Abyssinia from a female only. Dr. ADELUNG was not quite certain if this species and *brachyptera* ADEL. also described from a female, were rightly referable to the genus *Mallotoblatta*. The male of *kraussi* certainly does not conform quite strictly to the generic type as represented by *M. pubescens* SAUSS. and ZEHNT., and *M. pilosella* SAUSS. and ZEHNT. from Madagascar, for the pronotum is not »chiffonée», the supra-anal plate is produced and quadrate instead of transverse, the form of the dorsal abdominal tergites and scent-gland opening is different and the front-femora are armed according to the type *A* of SAUSSURE insted of according to type *B*. Nevertheles in the erect pubescence, and in the venation of tegmina and wings *M. kraussi* shows such close affinities to the Mascarene species that for the present it may be allowed a resting-place in the same genus. The discovery of the females of the Mascarene species may occasion the erection of a new genus for the continental forms in which sexual dimorphism is a leading characteristic.

Gen. **Hololampra** SAUSS.

Two species of this characteristically Palaearctic genus occur in the Kilimandjaro region, one species only is represented by both sexes and the male of this differs from those of all the other representatives of the genus by the length of the wings. The females of the two species may be distinguished as follows:—

1. Testaceous, tegmina and pronotum with brown points . . . *sjöstedti* n. sp.
1'. Abdomen and head piceous . . . . . *aethiopica* n. sp.

Hololampra æthiopica n. sp.

(Plate 2. Fig. 1.)

♂. Piceous. Antennae fuscous. Pronotum trapezoidal, margins broadly hyaline, disc with scattered brown points or with dark castaneous blotches symmetrically arranged. Scutellum exposed. Tegmina equal to the body in length, clear testaceous with scatted castaneous points on the veins and minute brown maculations between the veins; 9—10 costal veins, 5—6 oblique discoidal sectors, anal vein impressed. Wings abbreviated, reaching the 6th abdominal tergite, hyaline veins infuscated,

5—6 rudimentary costal veins, distal half of median vein alone visible, medio-discal area crossed by transverse nervules, ulnar vein simple, 1st axillary triramose. Abdomen above with the first 6 abdominal tergites piceous, the remainder flavo-testaceous, the posterior borders of 6th—8th tergites emarginate, opening of scent-glands on 7th tergite, supra-anal lamina transverse, slightly produced—Cerci fuscous, 7 jointed. Abdomen beneath piceous, laterally margined with testaceous; sub-genital lamina irregular, elongate.

Femora castaneous, sparsely armed beneath, no genicular spines on the middle pair; tibiae and basal joints of tarsi flavo-testaceous, apical joints of tarsi fuscous.

♀. Larger; variable in colour, pronotum with brown points or heavily blotched with castaneous. Tegmina extending to 1st or 2nd abdominal tergite. Wings rudimentary. Abdomen piceous above, with the tergites margined with flavo-testaceous, or with flavo-testaceous spots only on their lateral margins; supra-anal lamina short, transverse; abdomen beneath piceous, laterally margined with testaceous, sub-genital lamina ample. Cerci piceous. Legs as in ♂.

Larvae have all the thoracic tergites testaceous variegated with castaneous, the abdomen piceous; the legs are entirely castaneous.

♂. Total length 6 mm, length of tegmina 5,9 mm; pronotum 2 mm × 3 mm.
♀. » » 7,1 » » » » 3 » » 2,2 » × 3,2 »

Kilimandjaro: Rain forest, Kiboscho, 3,000 m (February), 2 ♂♂, 6 ♀♀, 5 larvae.

Hololampra sjöstedti n. sp.

♀. Testaceous. Head rufo-testaceous, vertex covered. Pronotum trapezoidal, sides deflexed, lateral margins broadly hyaline, posterior border truncate, exposing the scutellum. Tegmina lanceolate, attaining the sixth abdominal segment, overlapping slightly, 8 costal veins, one ulnar vein with 5 branches, anal vein impressed, reaching the sutural margin at one half of its length; a few brown points occur on the veins. Wings rudimentary. Abdomen above variegated with fuscous, supra-anal lamina short transverse; abdomen beneath variegated with fuscous, disc fuscous, sub-genital lamina ample, its centre rufo-testaceous or castaneous; cerci six-jointed, rufo-testaceous. All the femora with two spines only on the anterior margin beneath, none on the posterior margin, with genicular spines and two apical spines.

Total length 6,5 mm; length of tegmina 4 mm; pronotum 2 mm × 3 mm.

Kilimandjaro: Kibonoto, zone of culture 1,000—1,900 m (August to December).

Lower *Meru:* Ngare na nyuki (January); Masai steppes (October). 22 ♀♀, 2 larvae. One example has the ootheca projecting from the end of the abdomen; it is chitinous and carried with the suture uppermost, it is not carinate.

The species appears to be nearest to *H. minuta* Shelf. from Madagascar.

Fam. **Phyllodromiidae.**

Gen. **Ischnoptera** Burm.

The East African species can readily be distinguished from species of *Phyllodromia*, not only by the wing venation but also by the longitudinal, instead of oblique, discoidal sectors of the tegmina and by the asymmetry of the sub-genital lamina and styles in the male sex. The following table will assist in the determination of the known species:—

1. Testaceous or rufo-testaceous species.
   2. Scent-glands of ♂ opening at base of supra-anal lamina, which is not much produced . . . . . *bimaculata* Gerst.
   2'. Scent-glands of ♂, not as above, supra-anal lamina produced *strigosa* Schaum.

1'. Rufo-castaneous or rufo-fulvous species.
   2. Small . . . . . *neutra* Sauss.
   2'. Larger . . . . . *incuriosa* Sauss.

I. strigosa Schaum. is recorded from Mosambique, it cannot be recognized with certainty. *I. neutra* Sauss. from »Africa meridionalis» is described from a female only and appears to differ in size only from *I. incuriosa* Sauss.

Ischnoptera bimaculata Gerst.

(Pl. 3, figs. 10 & 15.)

Phyllodromia bimaculata Gerstaecker, Arch. Naturg. XXXV, p. 206 (1869);
Von der Decken, Reisen in Ost-Afrika III (2) p. 4 (1873).

Gerstaecker's description does not include an account of the wing structure in this species; the venation is somewhat variable but at least two branches of the ulnar vein fail to reach the outer margin of the wing and are directed towards the dividing vein. On account of this character the species must be placed in the genus *Ischnoptera*. The 8th abdominal tergite in the male is completely hidden beneath the 7th tergite, the 9th tergite is also invisible and the base of the supra-anal lamina is depressed forming a cavity fringed with hairs, the scent glands open on the sides of two chitinous tubercles in this cavity. The sub-genital lamina is very irregular and notched on the left side, a style being situated in the notch, the right style is stouter and spinose, the apex of the lamina forms a hirsute lobe. Ootheca as in *Phyllodromia germanica* L.

Kilimandjaro: Kibonoto, lower slopes and 1,300—1,900 métres, under dead leaves in banana plantations. 21 ♂♂, 25 ♀♀. The species was originally recorded from Lake Jipe at Kilimandjaro (von der Decken).

Var. **sobrina** nov.

♂ and ♀. Castaneous, margins of pronotum hyaline its disc castaneous. Wings with veins fuscous.

1 ♂, 21 ♀♀ and numerous larvae. From the same localities as the typical form and also from Usambara. Structurally these two forms are identical and of similar size.

Ischnoptera incuriosa SAUSS.

(Pl. 3, figs. 6 & 7.)

Ischnoptera incuriosa DE SAUSSURE, Abh. Senckenb. Ges. XXI. p. 571 (1899).

Kilimandjaro: Kibonoto 1,000—1,300 métres (November and December), 2 ♂♂. Originally described from East-Africa e coll. VOELTZKOW.

Gen. **Phyllodromia** SERV.

Key to the East-African species.

1. ulnar vein of wings simple or bifurcate . . . . . *germanica* L.
1'. ulnar vein of wings multiramose.
  2. pronotum with two longitudinal fuscous vittae . . . *bivittata* SERV.
  2'. pronotum not as above.
    3. tegmina with numerous castaneous points . . . . *zehntneri* nom. n.
    3'. tegmina not as above.
      4. Opening of ♂ scent-glands situated on 7th abdominal tergite.
        5. Sub-genital lamina in ♂ with margins inflected, styles flattened . . . . . *supellectilium* SERV.
        5'. Sub-genital lamina in ♂ not as above, styles not flattened.
          6. Frons flattened . . . . . *nigromarginata* sp. n.
          6'. Frons rounded . . . . . *sjöstedti* n. sp.
      4'. Opening of ♂ scent-glands not situated on 7th abdominal tergite.
        5. Opening of ♂ scent-glands not visible . . . *insignis* sp. n.
        5'. Opening of ♂ scent-glands situated on supra-anal lamina. . . . . *testacea* sp. n.

P. trigonalis SAUSSURE from »Africa meridionalis» (VOELTZKOW) was described from a female; the rufous colour, trigonal supra-anal lamina, and front femora with completely armed anterior margin beneath, appear to be the distinctive features of the species.

Phyllodromia germanica L.

Blatta germanica, LINNÆUS Syst. Nat. (ed. 12) I (2) p. 668 n. 7 (1767).

Kilimandjaro: Kibonoto, 1,000—1,300 métres; *Meru* rain-forest; Massai steppes (January & May). 1 ♂, 7 ♀♀, 2 larvae. A cosmopolitan species.

Phyllodromia bivittata SERV. is not represented in Dr SJÖSTEDT's collection but has been recorded from Wanga (VON DER DECKEN); it is a cosmopolitan species and

can be distinguished from *P. germanica* L., by the castaneous stripe on the tegmina, the ramose ulnar vein of the wings, the notched supra-anal lamina of the male and transverse supra-anal lamina of the female and by the produced, and laterally compressed sub-genital lamina of the male, with finely cleft apex.

Phyllodromia supellectilium SERV.

(Pl. 3, fig. 11.)

Blatta supellectilium SERVILLE, Hist. Ins. Orth. p. 114 (1839).
Blatta extenuata WALKER, Cat. Blatt. Brit. Mus. p. 221 (1868).
Blatta figurata WALKER, Cat. Derm. Salt. Brit. Mus. V. Suppl. Blatt. p. 24 (1871).
Blatta transversalis WALKER, Cat. Derm. Salt. Brit. Mus. V. Suppl. Blatt. p. 25 (1871).
Phyllodromia delta KIRBY, Ann. Mag. Nat. Hist. (7) V. p. 280 (1900).

Kilimandjaro: Kibonoto 1,000—1,300 métres; Massai steppes. Lower *Meru*. *Usambara:* Mombo. 5 ♂♂. A cosmopolitan species, which is very variable in size; it can however always be recognized by the from of the sub-genital plate of the male. The lateral margins of this are inflected and the two styles are flattened. The supra-anal lamina is almost hidden by the ninth tergite; in the centre of the seventh tergite is a circular depression from which rises a bifurcate chitinous structure covered with a fine pubescence and the scent-glands open on either side of this.

Dr. SJÖSTEDT's specimens have been compared with three examples in the Oxford Museum determined by SERVILLE himself and though the Kilimandjaro specimens are larger and darker than SERVILLE's specimens (= *P. delta* KIRBY), I have no hesitation in referring them to *supellectilium* on account of the identity of structure. The female of *P. supellectilium* is very different from the male and this sexual dimorphism is a character that perhaps entitles this species to generic rank separate from *Phyllodromia*.

Phyllodromia zehntneri nom. nov.

Theganopteryx (*Pseudectobia*) *punctulata* DE SAUSSURE & ZEHNTNER, Grandidier. Hist. Madagasc. Orth. I p. 15 (1895).

Usambara: Tanga (June). 1 ♀.

I now think that I was wrong in referring this species to the genus *Theganopteryx*, sens. strict. (cf. Ann. Mag. Nat. Hist. (7) XIX. p. 36. 1907); the ulnar vein of the wing is described as »bi-ramose» not as »bifurcate» and its branches vary in number from three to four. The species also can not be referred to the genus *Pseudectobia* as defined by me (l. c.) but appears to fall quite naturally into the genus *Phyllodromia*. Unfortunately it is necessary to find a new specific name for it, since *punctulata* has already been applied to two species of *Phyllodromia*, viz. *P. punctulata* BEAUVOIS (1805) and *P. punctulata* BRUNNER (1893), for the latter species the name *brunneri* is suggested. *P. zehntneri* was previously recorded from Madagascar.

Phyllodromia nigromarginata sp. n.

(Pl. 3, fig. 12.)

♂. Testaceous. Head castaneous, vertex not covered by pronotum flattened, antennae testaceous. Pronotum transversely elliptical, variegated with castaneous,

with two oblique sulci on disc, lateral margins hyaline. Tegmina testaceous, 10 to 11 costals, the last 3 ramose, anterior ulnar sending 5 oblique branches to the sutural margin and 2 ramose branches to the apical margin, posterior ulnar simple. Wings hyaline, mediastinal vein unbranched, 10 costals. their apices incrassated, ulnar vein with 5 branches. Abdomen above with the disc testaceous with a central piceous blotch, margins castaneous, the last 4 tergites piceous; the scent glands open on the 7th tergite by two orifices, a papilla covered with fine setae placed between the openings; 9th tergite concealed; supra-anal lamina trigonal. Abdomen beneath rufo-testaceous broadly margined with dark castaneous; sub-genital lamina produced, no styles; cerci fuscous. Legs testaceous, front femora armed on the anterior margin beneath with a complete row of spines, the proximal spines being the longer; each femur with 1 genicular and 2 apical spines.

Total length 16 mm.; length of body 11,2 mm.; length of tegmina 14 mm.; pronotum 2,9 mm. × 4,2 mm.

Lower *Meru:* Ngare na nyuki. *Kilimandjaro:* Kibonoto 1,000—1,900 métres, 6 ♂♂.

Phyllodromia sjöstedti sp. n.

♂. Closely allied to the preceding species but smaller. Rufo-testaceous. Head castaneous, vertex rounded, not covered by pronotum; antennae infuscated, testaceous at base. Pronotum transversely elliptical, disc castaneous with a rufo-testaceous, macula on the posterior part, lateral margins broadly hyaline. Tegmina rufo-castaneous 11 costals, the last two ramose, anterior ulnar sending ramose branches to sutural and apical margins. Wings hyaline, suffused with rufo-testaceous on anterior margin, mediastinal vein simple, 9 costals the first 6 incrassated, ulnar vein with 5 branches. Abdomen above castaneous, scent-glands as in preceding species, supra-anal lamina shortly trigonal; abdomen beneath castaneous with the disc rufo-testaceous, sub-genital lamina ample, produced, slightly pubescent, with two styles; cerci elongate, fuscous. Legs testaceous, front femora armed beneath on anterior margin with a complete row of spines, of which the more distal are the longer; formula of apical spines ł, ł, ł.

Total length 14 mm.; length of body 10,6 mm.; length of tegmina 11,8 mm.; pronotum 3 mm. × 4,2 mm.

Lower *Meru* (November), 1 ♂.

Phyllodromia insignis sp. n.
(Pl. 3, fig. 8.)

♂. Castaneous. Antennae fuscous. Vertex of head not covered by pronotum. Pronotum transversely elliptical, lateral margins broadly hyaline, disc with some obscure impressions. Tegmina with costal margin to near apex hyaline, remainder of tegmina not uniformly castaneous but internervular spaces crossed by numerous minute hyaline streaks arranged more or less regularly; 9 costal veins, radial bifurcate and sending branches both to costal margin and to apex, anterior ulnar with 6 oblique branches, posterior ulnar simple. Wings infuscated, mediastinal vein with 2 branches, 8 costals, their apices incrassated, ulnar vein tri-ramose, the branches bifurcate.

Abdomen with the disc above testaceous; supra-anal lamina transverse; sub-genital lamina cucullate, deeply notched, the flattened styles springing from the borders of the notch; cerci elongate, fuscous. Legs testaceous, front femora armed with piliform setae only on the anterior margin beneath.

Total length 12 mm.; length of tegmina 9,5 mm.; pronotum 3 mm. × 3,9 mm.

Kilimandjaro: Kibonoto 1,000—1,300 métres (Sept.), 1 ♂.

Phyllodromia testacea sp. n.

(Pl. 2, fig. 14.)

♂. Pale testaceous. Head rufo-testaceous, vertex not covered by pronotum. Pronotum transversely elliptical, lateral margins broadly hyaline. Tegmina with marginal area very broad, 9 costal veins, the last ramose, anterior ulnar sending 5 branches to sutural and apical margins, the latter ramose; numerous transverse venulae between the veins. Wings hyaline, mediastinal vein bifurcate, the lower branch bi-ramose, 6 costal veins their apices not incrassated, end of radial vein ramose, ulnar vein with 4 branches. Abdomen rufo-testaceous towards apex, supra-anal lamina transverse, posteriorly incrassated, a depression occurs in the posterior edge on either side of the middle line and at the base of these the scent glands open. Sub-genital lamina produced considerably beyond the supra-anal lamina, cucullate at apex which is deeply and narrowly cleft, the flattened styles spring from the posterior margin; cerci long, testaceous. Front femora with piliform setae only on the anterior margin beneath; all the femora with genicular spines; formula of apical spines ♀, ♀, ♀.

Total length 14 mm.; length of body 11 mm.; length of tegmina 12 mm.; pronotum 3,6 mm. × 5 mm.

Usambara: Tanga (June), 1 ♂.

The nearest allies of this species appear to be *P. laterifera* Wlk., *P. propinqua* Wlk, *P. majuscula* Wlk. from the Indo-Malayan and Indo-Australian regions of the world. The remarkable form of the supra-anal lamina of *P. testacea* is however a sufficiently distinctive character and should render it easier of identification than is the case with so many of the obscure species of this large genus.

Gen. **Ceratinoptera** Brunner.

This genus should be reserved for those species of Phyllodromiinae characterized by short or reduced tegmina and short or rudimentary wings, the tegmina when reduced are lanceolate, not truncate nor lobiform, and the wings when present have the ulnar vein bifurcate or simple. In the genus *Allacta* the wings are well-developed but the ulnar vein is ramose, the median is sometimes absent. The genus *Temnopteryx* is characterized — as its name signifies — by the truncate tegmina and rudimentary wings.

The African species of *Ceratinoptera* may be distinguished as follows:

1. Castaneous species.
   2. Tegmina not banded nor variegated with paler colour.
      3. Pronotum not pale-bordered anteriorly.
         4. Tegmina much shorter than the body.
            5. Sub-genital lamina of ♂ posteriorly truncate, angles acute . *abbreviata* Sauss. (Réunion).
            5'. Sub-genital lamina of ♂ posteriorly rounded . . . . . *castanea* sp. n. (E. Africa).
         4'. Tegmina not or scarcely shorter than the body.
            5. Larger, legs testaceous . . . *madecassa* Sauss. (Madagascar).
            5'. Smaller, legs castaneous . . . *ovata* sp. n. (E. Africa).
      3'. Pronotum pale-bordered anteriorly . *abyssinica* Sauss. (Abyssinia).
   2'. Tegmina banded or variegated with paler colour.
      3. Pronotum with disc rufous.
         4. Minute species . . . . . *perpulchra* sp. n. (E. Africa).
         4'. Larger . . . . . *dimidiata* Gerst. (E. Africa).
      3'. Pronotum with disc not rufous.
         4. Disc of pronotum with testaceous maculae . . . . . *variegata* Schulth (E. Africa)
            = *hottentota* Sauss. (Delagoa Bay)
            = *transvaaliensis* Kirby (Transvaal).
         4'. Disc of pronotum concolorous . . *bolivari* Adel. (Gallaland).
1'. Testaceous or ferruginous species.
   2. Pronotum with fuscous markings on disc.
      3. Markings on disc of pronotum numerous . . . . . *inscripta* Wlk. (Natal).
      3'. Markings on disc reduced to two obsolescent vittae . . . . . *bimaculata* sp. n. (E. Africa).
   2'. Pronotum without markings on disc.
      3. Supra-anal lamina of ♂ transverse . *ferruginea* Schulth (S., W. & E. Africa).
      3'. Supra-anal lamina of ♂ produced.
         4. Opening of scent-glands at base of supra-anal lamina . . . . . *variabilis* sp. n. (E. Africa).
         4'. Opening of scent-glands on 7th abdominal tergite . . . . . *sjöstedti* sp. n. (E. Africa).

Blatta misella Stål. from Natal is a species of *Hololampra*.

Ceratinoptera bimaculata sp. n.

♀. Testaceous, broad, short. Frons with a castaneous band; apical joint of maxillary palpi and antennae except at base, fuscous. Vertex of head almost covered by the pronotum. Pronotum large, trapezoidal, lateral margins broadly, posterior margin narrowly hyaline, posterior border slightly obtusely angled, scutellum not exposed; two obsolescent castaneous vittae on the disc. Tegmina longer than the body, testaceo-hyaline, membranous, 10 costal veins, ulnar, anal and axillary veins obsolescent. Wings abbreviated, extending to the 2nd abdominal tergite. Abdomen above castaneous, laterally margined with testaceous; supra-anal lamina testaceous, small, triangular. Abdomen beneath testaceous, with lateral fuscous maculae obsolescent posteriorly; sub-genital lamina very large, semiorbicular. Legs testaceous, front femora with a complete row of long spines on the anterior margin beneath.

Total length 9,1 mm.; length of body 8 mm.; length of tegmina 6,1 mm.; pronotum 3 mm. × 4 mm.

Usambara: Mombo (June), 2 ♀♀.

The broad abdomen and the obsolescent venation of the membranous tegmina are the characteristic features of this species. Obsolescent venation is usually associated with a corneous and more or less opaque texture of the tegmina, its disappearance from delicate membranous tegmina is most unusual.

Ceratinoptera castanea sp. n.

♂. Allied to *C. abbreviata* Sauss. and *C. madecassa* Sauss. but differing from the former by its larger size and by the different shape of the sub-genital lamina and from the latter by the shorter tegmina.

Dark castaneous. Antennae fuscous, month parts testaceous. Pronotum trapezoidal, nearly covering vertex of head lateral margins rufo-castaneous, its posterior margin slightly obtusely angled. Tegmina lanceolate, corneous, extending to the 4th abdominal tergite, 10 costals, anal vein impressed, remainder of venation obscured. Wings much reduced, extending to middle of 2nd abdominal tergite. Supra-anal lamina transverse, slightly produced. Sub-genital lamina broad, transverse, slightly produced, its posterior angles rounded, with two short styles. Legs rufo-testaceous.

Length of body 12 mm.; length of tegmina 7 mm.; pronotum 4 mm. × 5 mm.

Usambara: Mombo (June), 1 ♂.

Ceratinoptera sjöstedti sp. n.

(Pl. 3, figs. 16—17.)

♂. Allied to *C. ferruginea* Schulth but with longer tegmina. Rufo-testaceous. Head castaneous, antennae testaceous at base, remainder infuscated; vertex of head not nearly covered by pronotum. Pronotum transversely elliptical with lateral margins hyaline, posterior border truncate, exposing the scutellum. Tegmina extending to penultimate segment, membranous; marginal field very broad, 12 costal veins, anterior

ulnar with 6 branches, posterior ulnar simple, 5 axillary veins. Wings reduced, attaining 2nd abdominal tergite. Opening of scent-glands a circular orifice on the 7th abdominal tergite. Supra-anal lamina trigonal, posterior border slightly emarginate: sub-genital lamina broad, produced, apex slightly cleft, with two styles asymmetrically placed. Titillator spinous.

Length of body 8,2 mm.; length of tegmina 7,5 mm.; pronotum 3 mm. × 4 mm.

Lower *Meru:* at the river Ngare na nyuki (January), 2 ♂♂.

Ceratinoptera variabilis sp. n.

♂. Rufo-testaceous. Head with a castaneous band between the eyes and two spots between the antennal sockets; antennae testaceous at base; vertex of head not covered by pronotum. Pronotum trapezoidal, sides deflexed, posterior margin obtusely angled, margins hyaline, disc rufo-testaceous or castaneous variegated with rufo-testaceous. Tegmina lanceolate, reaching the 7th segment, mediastinal area hyaline, mediastinal vein bi-ramose, 6 costals the last ramose, discoidal field with 5 longitudinal sectors. Wings minute, extending to 1st abdominal tergite. Abdomen rufo-testaceous variegated with castaneous, 7th tergite cucullate & concealing the 8th & 9th tergites; the scent-glands open at the base of the supra-anal lamina which is concave at its base with a median carina, the opening of the glands is fringed with hairs; supra-anal lamina produced, sub-quadrate, not exceeding the sub-genital lamina which is asymmetrical, terminating at apex in a rounded hirsute lobe and with two unequal styles. Front femora on anterior margin beneath armed with a complete row of spines, the more proximal the longer.

♀. Castaneous. Lateral margins of pronotum hyaline, disc sometimes with two or more testaceous maculae, scutellum exposed. Tegmina abbreviated, obovate, not extending beyond the 4th abdominal tergite, 9 costals, anterior ulnar with 4 oblique branches, posterior ulnar simple, anal vein impressed reaching sutural margin at a point one-third from the apex. Wings extending to third abdominal tergite, apex infuscated, costal veins obsolete, median vein straight prominent, ulnar vein stout, bifurcated at apex, 1st axillary vein 3-ramose, stout, the first branch with 3 short branches at apex. Abdomen piceous above and below; supra-anal lamina triangular; apex emarginate, sub-genital plate ample, semi-orbicular.

♂. Length of body 9,2 mm.; length of tegmina 5,2 mm.; pronotum 3,1 mm. × 4 mm.
♀. » » » 11 mm.; » » » 5,5 mm.; » 3 mm. × 4,2 mm.

Kilimandjaro: Kibonoto 1,000—3,500 métres (Sept.—Nov.), 4 ♂♂, 3 ♀♀, 8 larvae.

The apex of the abdomen is very similar in construction to that of *Ischnoptera bimaculata* Gerst.

♂. var. **truncata** nov.

Simular to above but tegmina and wings shorter, the former transversely truncate. 1 ♀. Lower Meru.

This low country specimen may, possibly be a distinct species, but in colour and general appearance it resembles so closely the mountain forms that I hesitate to separate it, at any rate until a male from the same habitat is found.

Ceratinoptera perpulchra sp. n.
(Pl. 2, fig. 2; Pl. 3, fig. 13.)

♂. Minute, rufo-testaceous, nitid. Head castaneous, rufous on vertex, basal joints of antennae testaceous, remainder fuscous; vertex covered by pronotum. Pronotum trapezoidal with two longitudinal vittae castaneous. Tegmina coriaceous, just failing to reach end of abdomen, a broad humeral stripe which extends as two narrow lines along the radial and ulnar veins, castaneous; 12 costal veins, anterior ulnar biramose, the remaining veins not visible. Wings rudimentary. Abdomen above rufo-testaceous with lateral margins and a central patch castaneous; scent-glands opening on 7th tergite, at base of two deep depressions; supra-anal lamina produced, rounded; cerci short, rufo-testaceous; abdomen beneath castaneous, sub-genital lamina rufo-testaceous, rounded, produced, styles asymmetrically placed. Legs testaceous, front femora as in preceding species.

♀. Somewhat larger, dark castaneous, the disc of the pronotum and field of tegmina rufous, lateral margins of pronotum and mediastinal field of tegmina pale testaceous; abdomen entirely castaneous, cerci fuscous. Tegmina shorter, wings rudimentary, supra-anal lamina triangular, sub-genital lamina ample, semi-orbicular. Legs testaceous, except the bases of the coxae which are castaneous.

♂. Length of body 5,5 mm.; length of tegmina 4 mm.
♀. » » » 7 mm.; » » » 3,8 mm.

Kilimandjaro: Kibonoto 1,000—1,900 métres (March to May, Sept., Oct.), 5 ♂♂, 5 ♀♀, 1 larva.

This is quite the smallest species of the genus; in colouration it approaches *C. dimidiata* GERST. but it lacks the transverse band on the tegmina.

Ceratinoptera ovata sp. n.

♀. Convex, castaneous, nitid. Vertex of head not covered by pronotum, antennae piceous. Pronotum trapezoidal, sides deflexed, posterior margin obtusely angled, lateral margins paler than the disc. Tegmina reaching base of supra-anal lamina, mediastinal area testaceous, 14 costals, anal vein impressed, remaining veins obscure, the part of the right tegmen overlapped by the left reticulated. Wings shorter than tegmina, 8 costals, their apices slightly incrassated, the last and apex of radial vein tri-ramose, ulnar vein bifurcated. Abdomen and cerci piceous, supra-anal lamina triangular, sub-genital lamina ample, semi-orbicular. Legs rufous.

Length of body 9 mm.; length of tegmina 6,4 mm.; pronotum 3 mm. × 3,9 mm.

Usambara, 1 ♀.

C. dimidiata GERST. is probably the nearest ally of the species but it was described from an imperfect specimen so that certainty on this point is impossible.

Ceratinoptera dimidiata GERST. has been recorded from Endara, E. Africa (VON DER DECKEN).

Gen. **Temnopteryx** BRUNNER.

Key to the East African species.

1. Fuscous, pronotum margined with testaceous . . . . . *abyssinica* SAUSS. & ZEHNT.

1'. Rufous or testaceous.

2. Testaceous.

3. Larger, 9 mm. long . . . . . *ectobioides* sp. n.

3'. Smaller, 7 mm. long . . . . . *affinis* sp. n.

2'. Rufo-testaceous or rufous.

3. Pronotum with central testaceous vitta . . . . . *caffra* SAUSS.

3'. Pronotum unicolorous . . . . . *rufa* sp. n.

Temnopteryx abyssinica SAUSS. & ZEHNT.

Temnopteryx abyssinica SAUSSURE & ZEHNTNER, Grandidiers Hist. Madagascar Orth. I p. 51 (1895)[1].
Temnopteryx saussurei BOLIVAR, Ann. Soc. Ent. France, vol. LXVI p. 292 (1897).

Kilimandjaro: Kibonoto 1,000–3,500 métres; Masai steppes.
Lower *Meru* (Sept. to Oct.); 10 ♀♀, 5 larvae.

These specimens differ very slightly in colour from the type, which occurs at Massowa; the posterior border of the pronotum is narrowly testaceous, and not provided with a testaceous macula as in the Abyssinian examples, the cerci are testaceous instead of fuscous, and the supra-anal lamina is fuscous instead of testaceous; with these slight differences excepted, the Kilimandjaro examples appear to be identical with the typical specimens. In one example the egg-mass is protruding from the cloaca, the eggs are enclosed in a thin transparent membrane through which the eyes of the developing embryoes can be distinctly seen; it is probably the case that this species carries the eggs until they are almost ready to hatch out. Another example is stated to have been found with termites, but the association was probably accidental.

Temnopteryx ectobioides sp. n.

(Pl. 2, fig. 12.)

♂. Pale testaceous. Head with a fuscous mark between the eyes and another between the antennal sockets, the area between these two marks, pale pinkish-white and nitid; antennae testaceous at base, remainder fusco-testaceous. Pronotum very broad, transversely truncate behind, just failing to cover vertex of head in front; lateral margins broadly hyaline, disc slightly rugulose with a few brown points and with a short fuscous vitta at each posterior angle. Tegmina quadrate just covering the first abdominal segment, with a few brown points between the veins, anal vein

[1] *Temnopteryx abyssinica* SAUSS. (Mém. Soc. Genève. XXIII p. 93. 1873) having been removed to the genus *Ceratinoptera* (vide antea), this species may be allowed to retain its original name.

not marked. Wings minute. Abdomen variegated with rufous and fuscous, more heavily marked below; cerci testaceous spotted with fuscous; supra-anal lamina triangular, apex notched; sub-genital lamina large, trigonal, a median carina, apex deeply cleft, two symmetrically disposed styles, which are bent downwards at right angles to the plane of the lamina. Legs testaceous; front femora armed on the anterior margin beneath with minute piliform spines; formula of apical spines, ½, ½, ½.

♀. Darker than male. Head similar but with a triangular castaneous spot at base of clypeus. Pronotum with an incomplete fuscous vitta on each side of the disc and continued on the meso- and metanotum; metanotum with a central fuscous vitta. Tegmina as in the male. Abdomen almost entirely dark castaneous variegated with testaceous; cerci fuscous, tipped with testaceous; supra-anal lamina triangular, apex emarginate; sub-genital lamina ample, semi-orbicular, posterior margin triangularly notched.

♂. Length of body 9 mm.; length of tegmina 2,1 mm:; pronotum 2,9 mm. × 4,8 mm.
♀. » » » 9 mm.; » 3 mm. × 4,6 mm.

3 ♂♂, 2 ♀. Lower *Meru* (December).

The nearest allies of the species are *T. nana* Sauss. from Senegal and *T. brachyptera* Bol. from North Africa, from both it may be distinguished by the form of the supra-anal and sub-genital plates.

Temnopteryx affinis sp. n.

♀. Allied to the preceding species, but smaller and entirely pale testaceous with only a few brown points on prothorax and tegmina. Tegmina quadrate, not extending beyond metanotum, mediastinal vein nearly reaching outer posterior angle, 4 costals, anal vein not marked. Abdomen above with four obscure longitudinal fuscous vittae, supra-anal lamina slightly produced, rounded, sub-genital lamina semi-orbicular, ample.

Length of body 7,2 mm.; length of tegmina 2 mm.; pronotum 2 mm. × 3,5 mm.

Meru rain-forest, 3,000—3,500 métres; 1 ♀.

Temnopteryx rufa sp. n.

♀. Rufous, nitid. Vertex of head not covered by pronotum; antennae fuscous, except basal joints which are rufous. Pronotum with sides deflexed, posterior margin very slightly angulated. Tegmina truncate, reaching 2nd abdominal segment, mediastinal vein sending two branches to outer margin, 10 costals, marginal field very broad, discoidal field narrow, anal vein nearly reaching apex of tegmina. Wings a little shorter than tegmina. Abdomen rufo-castaneous, supra-anal lamina trigonal produced, cerci castaneous, sub-genital lamina ample. Legs rufo-testaceous, front femora with anterior margin beneath armed throughout with spines, the distal shorter than the proximal; all the femora with genicular spines, formula of apical spines ½, ½, ½.

Total length 13 mm.; length of tegmina 5 mm.; pronotum 4 mm. × 5,2 mm.

Kilimandjaro: Kibonoto 1,300—1,900 métres (November); 1 ♀.

T. phalerata Sss. from S. Africa is perhaps the nearest ally of this species, which however can be distinguished by its smaller size and different colour.

Gen. **Loboptera** Br.

Loboptera nitida sp. n.

♀. Rufo-castaneous. Antennae with basal half testaceous, apical half fuscous. Vertex of head just covered by the pronotum. Pronotum transversely elliptical, posteriorly truncate, lateral margins broadly hyaline; tegmina hyaline, lobiform; lateral margins of metanotum hyaline. Abdomen broad, above castaneous, variegated with testaceous, beneath rufo-testaceous, darker on the sides; penultimate tergite with posterior margin produced in the middle, supra-anal lamina triangular, apex slightly carinate, emarginate, sub-genital lamina ample; cerci rufo-testaceous. Legs testaceous; front femora armed on the anterior margin beneath with piliform spines, formula of apical spines ♀, ♀, ♀, no genicular spine on front femora.

Length of body 8 mm.; length of tegmina 1,6 mm.; pronotum 3,8 mm. × 4 mm.

Usambara: Mombo (Jan. and June), 2 ♀♀.

One of the two specimens is very much darker than the other, being entirely castaneous both above and beneath.

The species recorded by Adelung from Abyssinia, *L. ras* has no arolia between the tarsal claws and therefore falls into the genus *Paraloboptera* Sauss.

Gen. **Apteroblatta** nov.

Allied to *Loboptera* Br. but tegmina entirely absent in both sexes. Eyes rather small, vertex very broad. Supra-anal lamina in both sexes triangular, produced, sub-genital lamina of male slightly produced with two symmetrical styles. Ootheca chitinous, carried with the suture uppermost. Front femora with anterior margin beneath with piliform setae, hind femora heavily armed with spines. Arolia present between tarsal claws.

Apteroblatta perplexa sp. n.

(Pl. 2, fig. 3 and 13.)

♂. Rufo-testaceous. Vertex of head not covered by pronotum. Thoracic tergites variegated with rufo-castaneous. Abdomen above with disc dark castaneous, marginal castaneous spots on tergites 2—6. Cerci castaneous. Abdomen beneath rufo-testaceous; sub-genital lamina with apex cleft. Legs testaceous; all the femora with genicular spines; formula of apical spines ♂, ♀, ♀.

♀. Simular to ♂ but larger. Castaneous markings on thoracic tergites forming a definite pattern. Abdomen above castaneous with a submarginal rufo-testaceous vitta on either side, not extending beyond 6th tergite, terminal tergites castaneous; supra-anal lamina with apex slightly notched. Cerci testaceous. Abdomen beneath rufo-castaneous, sub-genital lamina ample, semi-orbicular. Ootheca as in Loboptera.

♂. Length 6 mm.; pronotum 2 mm. × 2,5 mm.
♀. » 7—8 mm.; » 2,2 mm. × 3,1 mm.

Kilimandjaro: Kiboscho, »Bergwiesen», 3,000 métres. *Meru* rain-forest, 3,500 m. 5 ♂♂ and a large number of ♀♀.

Were it not for the presence in the series, of female specimens with the ootheca protruding from the cloaca, these minute cockroaches might readily be overlooked as larval forms of an unknown species of *Phyllodromia* or *Ischnoptera*. The species from Abyssinia described but not named by AELUNG (Ann. Mus. Zool. Acad. Imp. St. Petersbourg vol. IX p. 48, fig. 9 (1904)) may be referred to the genus *Apteroblatta* and named after the distinguished Russian entomologist *Adelungi*.

Fam. **Epilampridæ.**

Gen. **Calolampra** SAUSS.

Calolampra aptera SCHULTH.

Calolampra aptera de SCHULTHESS SCHINDLER, Ann. Mus. Civ. Gen. (2) Vol. XIX p. 169, Pl. II. fig. 2 (1898).

Kilimandjaro: Kibonoto. Lower *Meru:* Ngare na nyuki (November—January). *Usambara:* Tanga. 2 ♂♂, 5 larvae. Previously recorded from Ogaden and Kilimandjaro.

Gen. **Eustegasta** GERSTAECKER.

A careful examination of several species of this genus has convinced me that the genus is more naturally placed in the family *Epilampridæ* than in the *Perisphæriidæ*. The femora are armed, though sparsely, beneath, the front femora with three to four spines on the anterior margin, the hind femora with two to three on the anterior margin and one to two on the posterior margin, the mid femora are unarmed or else bear one spine on the anterior margin. The supra-anal lamina of the female is produced and generally the apex is cleft, so that it appears sub-bilobate. The facts that the sexes are alike and that the species are viviparous add a little more support to the view, based on structural features, that *Eustegasta* is out of place in the Perisphæriidæ.

Pronotum and tegmina marked with rufous . . . . *pœcila* SCHAUM.
Pronotum and tegmina unicolorous . . . . . *obsoleta* KIRBY.

Eustegasta obsoleta KIRBY.

Eustegasta obsoleta KIRBY, Ann. Mag. Nat. Hist. (7) vol. V. p. 287, 1900.

Usambara: Tanga (June). One female. The species has also been recorded from Nyassaland.

Eustegasta pœcila SCHAUM.

Panchlora pœcila SCHAUM., Ber. Akad. Berlin p. 777 (1853); Peter's Reise Mossamb., Zool. vol. V. p. 109, pl. 7, f. 2 (1862).

Usambara: Mombo (June). One female. Previously recorded from Mozambique and Nyassaland.

Fam. **Blattidæ.**

The old-world genera of Blattidæ with the posterior metatarsus longer than the remaining joints and the tibial spines in three rows may provisionally be distinguished as follows:

1. Tegmina of ♂ reduced, sometimes very short, wings present or absent; of ♀ reduced, sometimes quadrate, never squamiform.

Blatta L.
Type *orientalis* L.

2. Tegmina and wings of ♂ longer than body, no scent-glands opening on 1st abdominal tergite, mesonotum and metanotum with short backwardly directed processes. Tegmina of ♀ quadrate, wings absent, penultimate tergite not concealed by antepenultimate tergite.

Cartoblatta gen. n.
Type *pulchra* sp. n.

3. Tegmina and wings of ♂ longer than body, scent-gland opening on 1st abdominal tergite, mesonotum and metanotum with long backwardly-directed processes. Tegmina of ♀ squamiform, wings absent, penultimate tergite almost concealed by antepenultimate tergite which is depressed and declivous.

Pseudoderopeltis Krauss.
Type *antennata* Sauss.

4. Tegmina squamiform in both sexes, in ♀ penultimate tergite not concealed by antepenultimate tergite, which is not declivous.

Stylopyga Fisch.
Type *rhombifolia* Stoll.

5. Tegmina and wings longer than the body in both sexes; pronotum trapezoidal, anterior border arcuate, sides deflexed.

Periplaneta Burm.
Type *americana* L.

6. Closely allied to *Periplaneta* but the pronotum elliptical, the anterior border truncate, sides not deflexed.

Homalosilpha Stål.
Type *ustulata* Burm.

It is not easy to separate females of *Stylopyga* from females of *Pseudoderopeltis*, the declivous 6th abdominal tergite almost entirely hiding the 7th tergite is perhaps the most distinctive feature of the latter genus, giving the insects a peculiar truncate

appearance when viewed from the side. It is probable that the genus *Blatta* will have to be further subdivided, *orientalis* L., *concinna* HAAN, and *assiniensis* BOL. to take three examples, do not appear to be congeneric.

Gen. **Paramethana** nov.

Differs from *Dorylaea*[1] STÅL in the size of the second pulvillus of the posterior tarsi which covers the whole second joint, and differs from *Methana* STÅL in the reduction of the tegmina and wings which do not extend beyond the fifth abdominal tergite. Third antennal joint nearly three times as long as the second.

Paramethana robusta sp. n.

(Pl. 2, fig. 7.)

♀. Dark castaneous, nitid, broadly elliptical. Head castaneous, clypeus and mouth-parts rufo-testaceous, eyes less remote than antennal sockets, antennae fuscous, except the two basal joints which are rufo-testaceous; vertex of head not covered by pronotum. Pronotum broad, trapezoidal, sides deflexed, posterior margin sinuate, castaneous with a central rufo-castaneous mark, or rufo-castaneous with darker castaneous marks. Tegmina short and broad, overlapping considerably, semi-corneous, veins well-marked, mediastinal vein bifurcate, 9 costals, the last three ramose, anal vein deeply impressed, reaching sutural margin at a point one-third from apex. Wings a little shorter than tegmina, flavo-hyaline, apex slightly infuscated. Abdomen piceous above, castaneous below, posterior angles of penultimate tergite strongly produced, its posterior margin slightly produced, sinuate; supra-anal lamina produced, triangular, apex emarginate and deeply cleft. Cerci long, subacuminate, of thirteen joints. Legs rufo-castaneous, front femora with a complete row of spines on anterior margin beneath; tibial spines in three rows; posterior metatarsus exceeding remaining joints in length, bi-spinulose beneath, pulvilli of remaining joints large occupying the whole extent of the under surface of the joints. Total length 23 mm.; length of tegmina 13 mm.; pronotum 7 mm. × 10,1 mm.

Lower *Meru* (November); 4 ♀♀.

Gen. **Blatta** L.

Blatta propinqua sp. n.

Allied to *B. flavilatera* SAUSS. but tegmina in both sexes sub-lobiform.

♂. Dark castaneous. Head with clypeus flavid, ocelli not visible, antennae rufo-castaneous. Pronotum with a broad semicircular band of rufous on each lateral

[1] The type of the genus *Dorylaea* is *brunneri* STÅL. a species closely allied to *flavicincta* HAAN; both species are characterized by peculiar maxillary palpi and by the small size of the second pulvillus of the posterior tarsi; these are good generic characters. In Biol. Centr. Amer. Orth. I, p. 69, 1893, de SAUSSURE and ZEHNTNER re-define the genus *Dorylaea* and transfer to it the apterous species *rhombifolia* STOLL. which is certainly not congeneric with *flavicincta* HAAN and *brunneri* STÅL. This procedure is quite unnecessary, *rhombifolia* is a characteristic species of the genus *Stylopyga*, no useful purpose is served by forcing it into a genus that already includes two species marked by different generic characters.

margin. Tegmina nearly as broad as long, extending to middle of metanotum, their sutural margins failing to meet by half the breadth of the tegmen. Wings absent. Abdomen piceous above, 7th tergite slightly produced, its posterior margin sinuate, supra-anal lamina subquadrate, its posterior margin notched; abdomen beneath castaneous at base, piceous at apex, sub-genital lamina broad, extending a little beyond the supra-anal lamina, with two symmetrically disposed styles. Cerci piceous, acuminate. Legs rufous; pulvilli minute, apical.

♀. Resembles ♂ but piceous instead of castaneous. Tegmina relatively shorter and narrower, sub-triangular in shape. Seventh abdominal tergite, more produced; supra-anal lamina produced, cucullate, apex broadly emarginate. Legs darker.

♂. Total length 15 mm.; tegmina 3 mm. × 2,9 mm.; pronotum 5 mm. × 6,1 mm.
♀. » » 18,4 mm.; » 3 mm. × 3 mm.; » 5,1 mm. × 7 »

Kilimandjaro: Kibonoto 1,000—1,300 métres. Lower *Meru:* Masai steppes; 1 ♂, 1 ♀, 4 larvae.

The species closely resembles *Blatta flavilatera* SAUSS. but can at once be distinguished by the very reduced tegmina. The variety *castanea* ADEL. is probably a distinct species, the male has a prominent scent-gland opening on the 1st abdominal tergite as in the genus *Pseudoderopeltis* KRAUSS. *B. propinqua* affords a passage from the genus *Blatta* to the genus *Stylopyga* FISCH. *Blatta* at present may be reserved for those species in which the tegmina are not squamiform in both sexes and *Stylopyga* for those species with the tegmina squamiform or absent in both sexes but the discovery of a few more species like *propinqua* would cause this generic distinction to break down.

Gen. **Stylopyga** FISCH.

Stylopyga hottentota SAUSS.

Dorylaea hottentota DE SAUSSURE, Abhandl. Senckenb. Ges. XXI. p. 578 (1899).

Lower *Meru* (November); 1 ♀.

The species was previously recorded from East Africa e coll. VOELTZKOW. The specimen before me differs slightly from DE SAUSSURE's description but I believe that it must be referred to that species. There are eight species of *Stylopyga* occurring in Africa which can only be distinguished from one another with great difficulty and I believe that some of the species can be sunk as synonymous with others. The species are:

1.	*S. aethiopica* SAUSS.	Gaboon.
2.	*S. manca* GERST.	Cameroons.
3.	*S. anthracina* GERST.	Cameroons.
4.	*S. spinulifera* KRAUSS.	San Thomé, W. Africa.
5.	*S. hottentota* SAUSS.	E. Africa.
6.	*S. brancsiki* n. n. (= *S. anthracina* BRANCS.)	Zambesi.
7.	*S. senecta* REHN.	Zululand.
8.	*S. tetra* WLK.	Natal.

Stylopyga spinulifera KR. and *senecta* REHN can be distinguished by the form of the supra-anal lamina from all the other species; it is probable however that *senecta* REHN is synonymous with *tetra* WLK.; *anthracina* GERST. is possibly the male of *manca* GERST. In *aethiopica* SAUSS. the posterior angles of the last four segments are produced to form backwardly projecting teeth and the two last of these are reflected upwards; in *manca* GERST. the posterior margins of the abdominal tergites are furnished with a row of fine tubercles or plications, but both these characters may be present in both species. ADELUNG has recorded *manca* GERST. from Abyssinia with some doubt, the occurrence of West African species of insects in East Africa is not unknown and I should not be surprised to learn that the number of African species of *Stylopyga* could be reduced to two or three widely distributed forms. *S. rhombifolia* STOLL. has been recorded from Wanga, East Africa (VON DER DECKEN).

Gen. **Cartoblatta** nov.

♂ allied to *Periplaneta* BURM. but the pronotum transversely elliptical, anterior border truncate, posterior border slightly produced.

Tegmina and wings considerably longer than the body. Mesonotum and metanotum without long backwardly-directed processes. No scent-gland opening on first abdominal tergite.

♀ with the tegmina short, quadrate, not covering the first abdominal tergite. Sixth and seventh abdominal tergites slightly declivous, seventh tergite not covered by the sixth.

Cartoblatta pulchra sp. n.

(Pl. 2, fig. 4.)

♂. Head pale testaceous, the vertex, a curved band between the eyes, a band at base of clypeus castaneous, antennae fuscous. Pronotum pale testaceous, a complex lyrate mark on the disc and a few points on the lateral margins piceous; disc with an anterior and two lateral impressions. Tegmina, anterior part of the wings and the veins castaneous. Abdomen above flavo-testaceous with fusco-castaneous markings laterally, beneath testaceous heavily marbled with fusco-castaneous; supra-anal lamina quadrate, posterior angles rounded; sub-genital plate produced beyond the supra-anal lamina, posterior angles rounded, styles long, curved, arising from notches in the sides of the sub-genital plate. Cerci moderate. Legs testaceous, blotched with fusco-castaneous; posterior metatarsus equal in length to the remaining joints. 3nd joint not spined, pulvilli apical but rather large.

♀. Similar to ♂ but head less pale testaceous, the vertex not entirely castaneous, the curved band between the eyes narrower. Pronotum trapezoidal, posteriorly obtusely angled, anteriorly truncate, laterally deflexed, flavo-testaceous with more numerous castaneous points. Scutellum exposed. Tegmina castaneous, quadrate, posterior margin slightly concave. Abdomen flavo-testaceous heavily marbled with fusco-castaneous, posterior margin of 7th tergite sinuate, supra-anal lamina narrow,

produced, its apex cleft, genital valves castaneous. Cerci rufous, directed upwards. Posterior metatarsus rather shorter than remaining joints, pulvilli large.

♂. Total length 29 mm.; length of body 20 mm.; length of tegmina 25 mm.; pronotum 4,6 mm. × 7 mm.

♀. Total length 21 mm.; length of tegmina 5,4 mm.; pronotum 5 mm. × 8,2 mm.

Kilimandjaro: Kibonoto 1,300—1,900 métres (March to May; 2 ♂♂, 1 ♀, 8 ♀ larvae.

It is probable that *Stylopyga hova* Sauss. from Madagascar also belongs to this genus.

Gen. **Pseudoderopeltis** Krauss.

Pseudoderopeltis fulvornata sp. n.

(Pl. 2, fig. 9.)

♂. Head fusco-castaneous, ocelli, genae and mouth-parts testaceous, apical joint of maxillary palpi infuscated, basal two joints of antennae testaceous, remainder fuscous. Pronotum with two oblique impressions, castaneous, lateral margins testaceo-hyaline, disc with an irregular flavo-testaceous mark on either side of the middle line. Meso- and metanotum with backwardly directed processes, the latter long and slender. Tegmina rufo-castaneous, extending considerably beyond the end of the abdomen. Abdomen above testaceous at base, castaneous at apex, supra-anal lamina quadrate, its posterior margin slightly concave, testaceous with a central castaneous macula. Abdomen beneath castaneous, the disc rufo-castaneous. Cerci moderate. Legs castaneous, posterior metatarsus very long, pulvilli minute, second joint spined beneath.

Total length 23,5 mm.; length of body 16,9 mm.; length of tegmina 20 mm.; pronotum 4 mm. × 5,9 mm.

Kilimandjaro: Lower Kibonoto (February), 2 ♂♂.

Apparently allied to *Periplaneta brunneriana* Schulth.[1] from Somaliland, a true *Pseudoderopeltis*, and to *P. gildessa*[2] Adel. from Gallaland, but much smaller than either.

Pseudoderopeltis petrophila sp. n.

(Pl. 2, fig. 5—6.)

Allied to *P. saussurei* Adel. ♂. Differs from *P. saussurei* Adel.[3] in the following points: Head entirely black, nitid, except for the testaceous ocelli and rufous clypeus. Pronotum with the lateral yellow fasciae rather broader and extending to the posterior margin. Tegmina and anterior part of the wings dark castaneous. Abdomen above piceous, castaneous at base, beneath, entirely piceous, nitid.

♀. Nitid, piceous ornamented with yellow; allied to *P. spectabilis* Adel.[4] (= *P. saussurei* ♀) but head entirely black, except for ocelli and clypeus, which are as

[1] Ann. Mus. Civ. Gen. XXXIX p. 167 pl. 2, f. 1 (1898).
[2] Ann. Mus. Zool. St. Petersbourg VIII, p. 314 (1903).
[3] Ann. Mus. Zool. de l'Acad. Imp. Sci. St Petersbourg VIII. p. 316 (1903).
[4] l. c. IX, p. 467 (1905).

in the male; vertex rather flattened, rugose, face with two depressions between the antennal sockets, lower face transversely wrinkled. Pronotum with lateral vittae and two marks on the posterior fifth of the disc yellow, these marks are in some specimens joined to the lateral vittae. Tegmina piceous, lobiform, only just extending beyond the mesonotum, their apices rounded. Mesonotum with two irregular yellow marks on the disc. Metanotum with an irregular transverse yellow band. The five basal abdominal tergites each with a broad yellow band occupying the greater part of their surfaces; 6th tergite enlarged, concavely depressed yellow; 7th tergite short, triangularly produced, yellow; supra-anal lamina tectiform, carinate, apex emarginate, yellow with a black line on the margin. Cerci and abdomen beneath piceous.

Measurements of types:

♀. Total length 31 mm.; length of body 23 mm.; length of tegmina 26 mm.; pronotum 5,6 mm. × 7 mm.

♀. Length of body 22 mm.; length of tegmina 3,5 mm.; pronotum 7 mm. × 10 mm.

A very long series (115 specimens) of both sexes in all stages of growth from *Kibonoto* 1,300—2,000 métres, Masai steppes and Lower *Meru* in the acacia forest; the youngest larvae were taken in August and September, older larvae in September and October, the adults in November and December. The females and larvae were found in great quantities under stones bestrewing the steppe-country. Two males from Lower Meru exhibit slight variations, in one the yellow fasciae of the pronotum are reduced to short and narrow stripes, in another they are absent altogether; the size of the latter specimen is considerably less than that of the type, but I can find no other characters entitling it to separate specific rank and it may safely be regarded as an extreme variation. With this valuable and important series of specimens before me it is now possible for the first time to distinguish the females of the genus *Pseudoderopeltis* from the females of allied genera with certainty; as already stated their characteristic feature is the enlarged sixth abdominal tergite, which is concavely depressed and declivous so that the posterior part of the body in profile view appears as if it was obliquely truncated.

The species described by me from British E. Africa as *Blatta rothschildi*[1] must be referred to *Pseudoderopeltis*, the female exhibits all the characters of the genus and the male is possibly an abnormal specimen, for the tegmina are reduced but the right tegmen is shorter than the left; the other male characters such as the form of the meso- and metanotum and the opening of the scent-gland on the 1st abdominal segment conform to the *Pseudoderopeltis* type. *Stylopyga guttata* Sauss.[2] from Gallaland is possibly also a ♀ *Pseudoderopeltis*.

[1] Ann. Mag. Nat. Hist. (7) XIX. p. 39 (1907).
[2] Ann. Mus. Civ. Gen. XXXV. p. 75 (1895).

Gen. **Periplaneta** Burm.

No examples of this cosmopolitan genus occur in Dr. Sjöstedt's collection but two species have been previously recorded from Eastern Africa, viz: *P. americana* L. (von der Decken) and *P. africollis* Sauss. (Voeltzkow).

Gen. **Deropeltis** Burm.

Deropeltis melanophila Wlk.

Ischnoptera melanophila Walker, Cat. Blatt. Brit. Mus. Suppl., p. 146, 1869.
Deropeltis madecassa de Saussure, Soc. Ent. VI, p. 17 (1891); de Saussure and Zehntner Grandidier's Hist. de Madagascar, Orth. I, p. 77, pl. 3, ff. 28, 29 (1895).

Lower *Meru:* Meru rain-forest 3,000 m. (Oct.—Dec.). *Usambara:* Tanga; 4 ♂♂, 2 ♀♀ larvae.

Also recorded from Madagascar, Zanzibar and East Africa.

Deropeltis integerrima Br.

Deropeltis integerrima Brunner, Nouv. Syst. des Blatt. p. 245 (1865).

Lower *Meru:* Ngare na nyuki (November—January); 2 ♂♂, 6 ♀♀.

Previously recorded from Zanzibar; there is a specimen in the Paris Museum from Mombasa.

Deropeltis autraniana Sauss.

Deropeltis autraniana Saussure, Ann. Mus. Civ. Gen. XXXV, p. 78 (1895).

A long series (96 specimens) from Lower *Meru*, the steppe country and acacia forest (Sept. to Dec.) and *Kilimandjaro:* Kibonoto 1,000—1,300 métres. Abundant under stones.

The species is very variable in size in both sexes and the smaller species are less nitid than the larger. There are specimens in the Hope Museum, Oxford from Nairobi, British East Africa and the species was recorded by de Saussure from Gallaland and West Africa; it is very close to *D. wahlbergi* Stål from S. Africa and may eventually prove to be identical with it. The determination of the species of the genus *Deropeltis* is attended with considerable difficulty, as the number of forms is considerable and a good proportion have been described from one sex alone. The following tables will perhaps render more easy the tedious task of hunting through literature, whenever one of the more obscure species of the genus has to be identified.

Males.

(32) 1. Fuscous or piceous species.
(13) 2. Head and legs or legs alone different in colour to rest of body.
(8) 3. Head and legs rufous or castaneous.

(5) 4. Outer margin of tegmina sinuate . . . . . *erythrocephala* Fab. (S. Africa).
(4) 5. Outer margin of tegmina not sinuate.
(7) 6. Large species . . . . . *dmitriewi* Adel. (Abyssinia).
(6) 7. Small species . . . . . *gracilis* Burm. (S. Africa).
(3) 8. Legs only different in colour to rest of body.
(10) 9. Large species . . . . . *erythropeza* Adel. (Abyssinia).
(9) 10. Small species.
(12) 11. Legs red . . . . . *intermedia* Br. (Natal).
(11) 12. Legs testaceous . . . . . *sculpturata* Krauss. (Guinea).
(2) 13. Head and legs concolorous with rest of body.
(15) 14. Densely pubescent . . . . . *integerrima* Br. (Zanzibar, E. Africa).
(14) 15. Not densely pubescent.
(21) 16. Small species, body-length not exceeding 20—22 mm.
(20) 17. Tegmina considerably exceeding the body.
(19) 18. Pronotum opaque, finely punctate . . . . *wahlbergi* Stål. [= *atra* Br.] (S. Africa).
(18) 19. Pronotum nitid . . . . . *autraniana* Sauss. (Gallaland, E. and W. Africa).
(17) 20. Tegmina scarcely exceeding the body . . . *kachovskii* Adel. (Abyssinia).
(16) 21. Larger species.
(29) 22. Tegmina considerably exceeding the body.
(24) 23. Pronotum relatively very small . . . . . *adelungi* nom. n. [= *gracilis*, Adel.] (Abyssinia).
(23) 24. Pronotum relatively larger.
(26) 25. Posterior margin of mesonotum with long triangular processes . . . . . *pallidipennis* Adel. (Abyssinia).
(25) 26. Posterior margin of mesonotum without these processes.
(28) 27. Body-length 22 mm. . . . . *nigrita* Sauss. (Somaliland).
(27) 28. Body-length 29 mm. . . . . *melanophila* Wlk. (Madagascar E. Africa).
(22) 29. Tegmina not exceeding body by much.
(31) 30. Body-length 23 mm. . . . . *barbeyana* Sauss. (Somaliland).
(30) 31. Body-length 36,5 mm. . . . . *tullbergi* Borg (Cameroons).
(1) 32. Ferruginous or testaceous species.
(34) 33. Pronotum piceous . . . . . *bucana* Karsch. (Cameroons).
(33) 34. Pronotum not piceous.
(36) 35. Pronotum with three impressions on disc . . *triimpressa* Krauss. (Guinea).
(35) 36. Pronotum not as above . . . . . *negus* Adel. (Abyssinia).

Females.

(24) 1. Fuscous or piceous species.
(23) 2. Without rufous fasciae on the pronotum.
(8) 3. Head and legs castaneous or rufous.
(5) 4. Castaneous . . . . . *erythropeza* ADEL.
(4) 5. Rufous.
(7) 6. 6th and 7th abdominal tergites with a fulvous macula on either side . . . . . *dichroa* GERST. (Gold Coast).
(6) 7. Abdominal tergites uniformly coloured . . . *erythrocephala* FAB.
(3) 8. Head and legs concolorous with rest of body.
(10) 9. Densely pubescent . . . . . *integerrima* BR.
(9) 10. Not densely pubescent.
(20) 11. Angles of thoracic tergites strongly produced backwards.
(19) 12. Species exceeding 24 mm. in length.
(18) 13. Posterior margin of pronotum straight.
(17) 14. Posterior angles of abdominal tergites spiniform.
(16) 15. 38 mm. in length . . . . . *robusta* GERST. (Cameroons).
(15) 16. 25 mm. in length . . . . . *gaboonica* REHN (Gaboon).
(14) 17. Posterior angles of abdominal tergites not spiniform . . . . . *melanophila* WLK. [= *speiseri* BRANCS.]
(13) 18. Posterior margin of pronotum sinuate. . . . *schweinfurthi* SAUSS. (Somaliland).
(12) 19. Smaller species . . . . . *nigrita* SAUSS.
(11) 20. Angles of thoracic segments not strongly produced backwards. . . . . *kachovskii* ADEL.
(22) 21. Posterior margin of pronotum sinuate . . . *barbeyana* SAUSS.
(21) 22. Posterior margin of pronotum straight . . . *carbonaria* GERST. (W. Africa). *autraniana* SAUSS.
(2) 23. With rufous fasciae on the margins of the pronotum . . . . . *paulinoi* BOL. (Angola).
(1) 24. Ferruginous species . . . . . *triimpressa* KRAUSS.

As our knowledge of the genus extends, it will probably be found that some of these names are synonymous, e. g. *D. robusta* GERST. may prove to be the female of *D. tullbergi* BORG. DE SAUSSURE gives the range of *D. autraniana* as West Africa (Abetifi), Somaliland and Gallaland; from the descriptions alone I find it impossible to distinguish de SAUSSURE's species from *D. carbonaria* GERST. The following species which have been recorded by various authors as of the genus *Deropeltis*, either belong to other genera or else are of uncertain position:

Blatta capensis THUNB. = *Deropeltis erythrocephala* FAB.
Euryzosteria delalandii SAUSS. = *Deropeltis erythrocephala* FAB.
Perisphaeria verticalis BURM. = ? *Deropeltis*.
Periplaneta orba STÅL. = *Pseudoderopeltis*.
Periplaneta albilatera STÅL. = *Pseudoderopeltis*.
Periplaneta caffra STÅL. = *Periplaneta caffra*.
Kakerlac brevicollis SERV. = ? *Pseudoderopeltis*.
Ischnoptera longipennis WLK. = *Pseudoderopeltis*
Ischnoptera juncea SAUSS. = *Pseudoderopeltis*
Ischnoptera similis SAUSS. = *Pseudoderopeltis*
Deropeltis longipennis SAUSS. = *Pseudoderopeltis*
Deropeltis antennata SAUSS. = *Pseudoderopeltis*
Polyzosteria capensis SAUSS. = *Pseudoderopeltis*.
[=*Deropeltis flavomarginata* BR.] = *Pseudoderopeltis*.
Polyzosteria meridionalis SAUSS. = *Blatta*.
[= *Deropeltis bivittata* BR. = *Blatta*.
[= *Deropeltis distanti* KIRBY] = *Blatta*.
Ischnoptera macra STÅL. = *Perisphaeriinae*.
Deropeltis burmeisteri SAUSS. ? *nomina nuda*, only mentioned in a synoptical key
Deropeltis peringueyi SAUSS. (Ann. Mus. Civ. Gen. vol. XXXV, p. 77 (1895).

Fam. **Panchloridæ.**

Gen. **Leucophaea** BR.

Leucophaea sp.

Kilimandjaro: Kibonoto 1,300—1,900 (November). 9 larvae (♂ and ♀).

These are not the larvae of *L. surinamensis* L. being considerably larger; it is in the highest degree probable that they belong to an undescribed species. *Surinamensis* has been recorded from Wanga (VON DER DECKEN).

Gen. **Panchlora** BURM.

Panchlora camerunensis BORG.

Panchlora camerunensis BORG. Bih. K. Svenska Vet. Akad. Afd. IV. No. 10. p. 24. 1902.

Kilimandjaro: Kibonoto 1,000—1,900 métres (November, March), 8 ♂♂, 8 ♀♀, 1 larva.

This appears to be the same species as that described by BORG from the Cameroons, also collected by Dr. SJÖSTEDT; the East African specimens are a trifle larger but otherwise appear to be identical.

Gen. **Nauphoeta** Burm.

Nauphoeta cinerea Oliv.

Blatta cinerea Olivier, Enc. Méth. Ins. IV, p. 314, n. 3, 1789.

Kilimandjaro (Sept.); Kibonoto 1,000—1,900 métres (May); *Usambara:* Mombo (June); 2 ♂♂, 4 ♀♀, 3 larvae.

A widely distributed species.

Gen. **Gyna** Br.

Gyna vetula Br.

Gyna vetula Brunner v. Wattenwyl, Nouv. Syst. des Blatt. p. 267 (1865).

In the Mkulumusi-caves at *Tanga* (July), 1 ♂, 1 ♀, 17 larvae.

Previously recorded from Mombasa (von der Decken) and the East coast of Africa.

It seems quite certain that the genera *Trichomera* Kirby[1] and *Apotrogia* Kirby[2] are founded on immature specimens of species of *Gyna*. The larvae collected by Dr. Sjöstedt are certainly most closely allied to *Trichomera insignata* Kirby; they are preserved in alcohol together with one adult male in bad condition and were probably taken altogether from under one shelter. The backwardly produced angles of the meso- and metanotum proclaim the immature condition of these specimens as well as of *T. insignata* Kirby and *Apotrogia angolensis* Kirby. I find moreover that the structure of the maxillary and labial palpi, the form of the coxae and the arrangement of speines on the tibiae is identical in the larvae and adults. The palpi in the genus *Gyna* are highly characteristic, being very slender and rather long, and the coxae are provided with a peculiar curved flange, situated on the outer posterior angle; the front tibiae in the larvae are shorter than they are in the adults, but this feature is probably associated with fossorial habits, abandoned when the insects become winged adults. The arolium between the tarsal claws does not develop until the larvae are nearly full-grown and it is then smaller than in the adult. The pronotum is far less backwardly produced in the larvae than in the adults, as is also the case with larval Epilamprides, larvae of *Panchlora* and of *Rhyparobia*. Finally the larvae are much more heavily marked with castaneous than are the adults and there are rows of minute tubercles on the dorsal tergites.

Gen. **Phenacisma** Karsch.

The type of the genus, *P. peltata* Karsch has been recorded from Mombasa.

[1] Ann. Mag. Nat. Hist. (6) XVIII. p. 257 (1896).
[2] ibidem (7) V. p. 281 (1900).

Fam. **Corydiidæ.**

Gen. **Anacompsa** nov.

Finely pubescent. Eyes approximate. Antennae filiform, shorter than body. Pronotum cucullate, covering vertex of head, small, sides deflexed, posterior border arcuate. Tegmina and wings elongate, extending considerably beyond the apex of the abdomen; costal veins few and irregular, discoidal area of tegmina reticulated, axillary veins obsolescent; posterior part of wing ample, median vein simple, ulnar vein ramose at extremity. Supra-anal lamina of ♂ transverse. Cerci moderate. Tibiae weakly armed, spines on posterior pair triseriate with 4 apical calcaria, 4 apical calcaria on front pair. Tarsal claws with arolia.

In general appearance the genus resembles *Latindia* STÅL but is distinguished from that and its allies, *Hemilatindia* SAUSS. and *Paralatindia* SAUSS. by the triseriate arrangement of the tibial spines. From *Holocompsa* BURM. and *Hypercompsa* SAUSS. it is distinguished by the long tegmina of uniform texture; *Ipisoma* BOL. is characterised *inter alia* by the reduced tegmina. It is probable that a considerable number of species of these fragile little cockroaches are still unknown to science, they are rare in collections but probably because they have been neglected by most collectors in favour of larger and more conspicuous forms.

Anacompsa cucullata sp. n.

(Pl. 2, fig. 10 and 11, Pl. 3, fig. 9.)

♂. Head dark castaneous, mouth parts testaceous; frons not swollen, ocelli large. Antennae fuscous, filiform, of 30 joints, joints longer than broad and increasing in length distally. Pronotum rufo-testaceous, disc with two oblique impressions. Tegmina long, overlapping strongly, finely pubescent, membranous, rufo-testaceous with a broad humeral vitta extending to half the total length, fuscous; mediastinal vein with a few incomplete branches, 6 costal veins, their ends not reaching the anterior margin of the tegmen, anterior ulnar ramose at its apex, posterior ulnar ramose, transverse anastomoses uniting the branches, anal vein curved reaching the sutural margin at a point one-fifth of the total length, axillary veins obsolescent. Wings hyaline, flavo-testaceous on the sutural margin, mediastinal vein simple, 6 irregular costals, ulnar vein ramose at its extremity, posterior field ample larger than the anterior field. Abdomen castaneous, flavo-testaceous at base, supra-anal lamina transverse, sub-genital small, right style absent, left style represented by a flattened lobe, the origin of which is hidden by the penultimate sternite. Cerci moderate, testaceous, segmentation obscure. Legs testaceous; front tibiae with only 4 spines on the anterior border, 2 being apical, 3 on the posterior border, 2 being apical; spines on mid- and hind-tibiae triseriate; front femora with no genicular spine, formula of apical spines $\frac{1}{0}$, $\frac{1}{0}$, $\frac{1}{0}$.

Total length 10,5 mm.; length of body 7,5 mm.; length of tegmina 9 mm.; pronotum 2 mm. × 2,9 mm.

Lower *Meru*: Ngare na nyuki (January); 2 ♂♂.

Gen. **Sphecophila** Shelf.

Sphecophila termitium sp. n.

(Pl. 3, figs. 1—2.)

♂. Fulvous, rufo-fimbriate. Head with vertex not covered by pronotum, antennae consisting of 30 joints, similar in structure to those of *S. polybiarum* mihi,[1] frons swollen, ocelli minute, eyes much reduced. Body above with a minute recumbent pubescence, margins rufo-fimbriate. Posterior margins of pronotum and of mesonotum slightly obtusely angled, postero-lateral angles of meso- and meta-notum backwardly produced. Ten abdominal tergites visible, 8th and 9th very narrow almost concealed beneath the 7th, supra-anal lamina quadrangularly produced, angles rounded, posterior margin slightly excised; cerci short, one-jointed, acuminate; seven abdominal sternites visible, subgenital lamina sub-triangularly produced, rounded, with a pair of slender styles, podical plates prominent, tumid. Legs as in *S. polybiarum*, except that there is an anterior apical spine on the front femora, genicular spines of first and second femora very stout and long.

Total length 7,1 mm.; pronotum 2,1 mm. × 4,1 mm.

Kilimandjaro: Kibonoto, March 1906. 2 ♂♂ from nest of *Termes bellicosus*.

It is certainly surprising to find a species of cockroach symbiotic with termites in E. Africa, congeneric with a South American species living in a wasp's nest; I have utterly failed to find, however, any characters entitling the former species to separate generic rank from the latter. The large size and the brilliant fulvous colour of the African species readily serve to distinguish it from *S. polybiarum*, but in both species the structure of the head, eyes, mouth-parts, form of the body, armature of the legs, shape of the terminal abdominal scutes is closely similar. Dr. Sjöstedt's specimens have been preserved in alcohol and the abdominal segments have become somewhat distended, so that the podical plates appear very prominently, but they are also clearly visible in dried specimens of *polybiarum* and their prominence may possibly be regarded as a character of the genus. Further collections of cockroaches symbiotic with other insects will reveal perhaps some day the wide distribution of this genus. At present the species described here is the only cockroach living in company with social insects that has yet been recorded from the Old World.

Gen. **Euthyrrhapha** Burm.

The cosmopolitan species *E. pacifica* Coq. has been recorded from Wanga (von der Decken).

[1] Trans. Ent. Soc. London 1906, p. 518.

Fam. **Oxyhaloidæ.**

Gen. **Oxyhaloa** Br.

Key to E. African species.

1. Tegmina smooth . . . . . *O. ferreti* Reiche and Fairm.
1'. Tegmina with minute recumbent pubescence.
2. Tegmina attaining end of abdomen . . . . *O. deusta* Thunb.
2' Tegmina not attaining end of abdomen. . . *O. variabilis* Shelf.

Oxyhaloa variabilis Shelf.

Oxyhaloa variabilis Shelford, Ann. Mag. Nat. Hist. (7) vol. 19, p. 41, 1907.

Kilimandjaro: Kibonoto 1,000—1,300 métres (Feb., Apr., Nov.); 3 ♀. Previously recorded from the interior of Djibouti. The species is very close to *O. deusta* Thunb. (= *fulviceps* Burm.), which together with *O. ferreti* Reiche and Fairm. has been recorded from Lake Jipe at Kilimandjaro (von der Decken).

Fam. **Perisphaeriidæ.**

Gen. **Gynopeltis** Gerst.

Gynopeltis cryptospila Wlk.

Polyphaga cryptospila Walker, Cat. Blatt. Brit. Mus., p. 15 (1868).
Gynopeltis picta Gerstaecker, Arch. Naturg. XXXV, p. 208 (1869); Von der Decken's Reisen in Ost-Afrika, III (2), p. 9, pl. 1, ff. 1. 2 (1873).

Kilimandjaro »Misehwald»; Kibonoto 1,000—1,900 métres; Steppe country. *Meru* 3,000 métres. 4 ♂♂, 10 ♀♀. Previously recorded from Endara and Mosambique.

Gen. **Derocalymma** Burm.

The two East African species can be distinguished as follows:

Males.

1. Body-length 19 mm., antennae entirely fuscous . . . . . *porcellio* Gerst.
1'. Body length 15 mm., antennae with broad pale annulus . . *lampyrina* Gerst.

Females.

1. Length of pronotum : breadth of pronotum : : 550 : 935; antennae enterely fuscous . . . . . *porcellio* Gerst.
1'. Length of pronotum : breadth of pronotum : : 550 : 1050; antennae with broad pale annulus at base and at apex. . . . . *lampyrina* Gerst.

Derocalymma porcellio GERST.

Derocalymma porcellio GERSTAECKER Arch. Naturg. XXXV, p. 207 (1869); Von der Decken's Reisen in Ost-Afrika, III (2), p. 7, pl. 1, f. 3 (1873).

Lower *Meru:* Ngare na nyuki. *Kilimandjaro:* Kibonoto 1,000—1,300 métres (Sept. to Jan.); 19 ♀♀ adult and larval. Previously recorded from Lake Jipe at Kilimandjare and Uru, East Africa.

Derocalymma lampyrina GERST.

Derocalymma lampyrina GERSTAECKER, ll. cc., p. 207 (1869); p. 8 (1873).

Usambara: Mombo (June); 3 ♀♀. Previously recorded from between Lake Jipe and the Bura Mts.

Gen. **Cyrtotria** STÅL [= **Stenopilema** SAUSS.]

Dr. SJÖSTEDT has kindly sent to me for examination a number of STÅL's types of Blattidæ. Amongst these are the male and female types of *Cyrtotria gibbicollis* STÅL and they prove to be congeneric with the species included by de SAUSSURE and ZEHNTNER (Rev. Suisse Zool. III, p. 25 (1895) in the genus *Stenopilema.* In the genus *Cyrtotria* the distinguished Swiss orthopterists place *Derocalymma dispar* BURM. *Cyrtotria macra* STÅL and with some doubt *Perisphaeria affinis* BURM.; the first of these is certainly not congeneric with *C. gibbicollis* STÅL and a new genus must be created for its reception; the type is in BRUNNER's collection and has been well described so that it is easily recognisable, the other two species are of uncertain systematic position. *Stenopilema* SAUSS. of course sinks as a synonym of *Cyrtotria* STÅL. It may be noted here that *Perisphaeria linearis* WALK. is synonymous with *Cyrtotria gibbicollis* STÅL.

Cyrtotria capucina GERST.

Derocalymma capucina GERSTAECKER, Arch. Naturg. XXXV, p. 207 (1869); Von der Decken's Reisen in Ost-Afrika, III (2), p. 8, pl. 1, f. 4 (1873).

♂. Piceous. Eyes contiguous; antennae fuscous, basal joints paler; ocelli and mouth parts testaceous. Pronotum with margins castaneous, disc strongly punctate with a few smooth interspaces, anteriorly carinate. Tegmina dark castaneous in basal fourth, remainder testaceous, marginal area at base testaceous, eight longitudinal discoidal sectors. Wings hyaline, veins testaceous, ulnar vein sending one branch to apex of wing, six incomplete branches to dividing vein. Supra-anal lamina quadrate, its posterior margin slightly concave; sub-genital lamina irregular, laterally margined with testaceous; cerci and styles testaceous. Coxae castaneous, outwardly margined with testaceous; legs testaceous.

Total length 18,7 mm.; length of body 14 mm.; length of tegmina 15,6 mm.; pronotum 4 mm. × 4 mm.

Cyrtotria gibbicollis STÅL is very near this species.

Kilimandjaro: Kibonoto 1,000—1,900 métres, Masai steppes (Aug. to Nov.). Lower *Meru*. 2 ♂♂, 33 ♀♀ adult and larval. Previously recorded from Aruscha, E. Africa.

Cyrtotria tuberculata sp. n.

♀. Allied to *C. capucina* GERST. but the pronotum anteriorly with small scattered tubercles, posteriorly rugose with a few fine punctures. Head more rufous.

Total length 15 mm.; pronotum 5 mm. × 5 mm.

Kilimandjaro: Lower Kibonoto (Feb.), 1 ♀.

Gen. **Parasphaeria** BR.

Parasphaeria ? marmorata sp. n.

(Pl. 2, fig. 8.)

♀. Testaceous, marbled with fuscous. Head only half covered by pronotum: eyes rather small and wide apart, ocelli absent, antennae fuscous, equal to half the body-length; frons rufo-castaneous, face with dark markings. Pronotum trapezoidal, anterior and posterior margins truncate, lateral margins hyaline, disc with a few shallow punctures and with a dark lyrate marking. Tegmina lobiform, testaceo-hyaline; mesonotum and metanotum with scattered punctures and dark markings symmetrically arranged, lateral margins hyaline. Abdominal tergites with scattered shallow punctures laterally bordered with testaceous, their posterior margins broadly olive brown, a central row of fuscous spots and a sub-marginal row on each side of similar markings, in addition some irregular fuscous markings between the central and submarginal rows; 1st to 7th tergite divided by a transverse suture into a narrow anterior half and a broader posterior half. Supra-anal lamina slightly produced, trigonal; cerci very short, of four joints. Abdominal sternites with submarginal row of castaneous spots, an irregular transverse row of markings on each sternite, except the last which is castaneous on the disc; each sternite exeept the last is divided like the tergites; sub-genital lamina ample, semiorbicular, extending beyond the supra-anal lamina. Legs short, testaceous, a fuscous line on the outer side of the femora; tibial spines in three rows: posterior metatarsus not equal to the remaining joints; arolia large.

Length 15 mm.; pronotum 3 mm. × 4,5 mm.

Lower *Meru* (Nov.); 1 ♀.

I have been unwilling to place this species in the Neotropical genus *Parasphaeria*, but the unique female specimen certainly presents no features whereby it can be separated therefrom; the exposed head, lobiform tegmina, tibial spines and short tarsi are the distinctive characters of *Parasphaeria* and until the male sex is discovered this species must be allowed a place in that genus.

Table showing the distribution in other parts of Africa of the species of the Kilimandjaro-Meru district.

Kilimandjaro-Meru district	Cosmopolitan	Abyssinia	Somaliland	E. Africa from 5° S. to Zambezi	Africa S. of Zambezi	W. Africa	Madagascar
1. *Theganopteryx africana*				×			
2. *Theganopteryx saussurei*			×			×[1]	
3. *Mallotoblatta krausi*		×					
4 *Hololampra aethiopica*							
5. *Hololampra sjöstedti*							
6 *Ischnoptera bimaculata*				×			
7. *Ischnoptera incuriosa*				×	×		
8. *Ischnoptera neutra*				×			
9. *Phyllodromia germanica*	×						
10. *Phyllodromia bivittata*	×						
11. *Phyllodromia supellectilium*	×						
12. *Phyllodromia zehntneri*							×
13. *Phyllodromia nigromarginata*							
14. *Phyllodromia sjöstedti*							
15. *Phyllodromia insignis*							
16. *Phyllodromia testacea*							
17. *Phyllodromia trigonalis*				×			
18. *Ceratinoptera bimaculata*							
19. *Ceratinoptera castanea*							
20. *Ceratinoptera sjöstedti*							
21. *Ceratinoptera variabilis*							
22. *Ceratinoptera perpulchra*							
23. *Ceratinoptera ferruginea*				×			
24 *Ceratinoptera ovata*							
25. *Ceratinoptera varicgata*				×			
26. *Ceratinoptera dimidiata*							
27. *Temnopteryx abyssinica*		×		×			
28. *Temnopteryx ectobioides*							
29. *Temnopteryx caffra*				×			
30. *Temnopteryx affinis*							
31. *Temnopteryx rufa*							
32. *Loboptera nitida*							
33. *Apteroblatta perplexa*							
34. *Calolampra aptera*			×				
35. *Eustegasta obsoleta*				×			
36. *Eustegasta pœcila*				×			
37. *Paramethana robusta*							
38. *Blatta propinqua*		×	×				
39. *Stylopyga hottentota*				×			
40. *Stylopyga rhombifolia*	×						
41. *Carloblatta pulchra*							

[1] An cross (×) denotes a closely allied species or topomorph.

	Kilimandjaro-Meru District	Cosmopolitan	Abyssinia	Somaliland	E. Africa from 5° S to Zambezi	Africa S of Zambezi	W Africa	Madagascar
42.	*Pseudoderopeltis fulvornata*							
43.	*Pseudoderopeltis petrophila*							
44.	*Periplaneta americana*							
45.	*Periplaneta atricollis*							
46.	*Deropeltis melanophila*							
47.	*Deropeltis integerrima*							
48.	*Deropeltis autraniana*							
49.	*Panchlora camerunensis*							
50.	*Nauphoeta cinerea*							
51.	*Gyna vetula*							
52.	*Phenacisma peltata*							
53.	*Anacompsa cucullata*							
54.	*Sphecophila termitium*							
55.	*Euthyrrhapha pacifica*							
56.	*Oxyhaloa deusta*							
57.	*Oxyhaloa ferreti*		*					
58.	*Oxyhaloa variabilis*							
59.	*Gynopeltis cryptospila*							
60.	*Derocalymma porcellio*							
61.	*Derocalymma lampyroides*							
62.	*Cyrtotria capucina*							
63.	*Cyrtotria tuberculata*							
64.	*Parasphaeria (?) marmorata*							

The above table includes 64 species[1] and a glance at their distribution shows as might have been safely predicted that the closest affinity of this Blattid fauna is found in East Africa between the 5th degree of latitude and the Zambezi River; 20 of the species are common to these two areas and I have little doubt that the number would be increased if our knowledge of the cockroaches of the latter area was greater than it is. 7 of the species are cosmopolitan or nearly so and consequently afford no evidence worth taking into consideration. The relationship with the Abyssinian fauna is rather surprisingly remote, but can perhaps be accounted for by the intervention of the xerothermic area of Somaliland and Gallaland between the damp moist regions of Abyssinia and Kilimandjaro: it is significant that there is a much closer relationship between the faunas of these two regions in the case of insects capable of sustained flight such as the Lepidoptera Rhopalocera. Only 4 of the species occur also in Africa south of the Zambesi and the entire absence from the Kilimandjaro region of certain highly characteristic South African genera is in sharp contrast to the fact that all the Abyssinian genera save two[2] are represented in the Kilimandjaro region. The connection with the West African and Mascarene faunas

[1] An immature and undetermined species of *Leucophaea* is omitted.

[2] One of these two is *Paralobopteva*, a genus barely separable from *Lobopteva* which is represented by one species in the Kilimandjaro regions.

is of the remotest, but that there should be any species common to regions so widely separated is of much interest. The absence from a given fauna of certain genera and species often affords as much food for speculation and as many points of interest as the presence of others, and this fauna offers no exception to such a statement. The genus *Anaplecta* is moderately represented in West Africa but except for one species from the Soudan is absent in the East. *Epilampra* is well represented in West Africa but is entirely absent from the Eastern and Southern regions, its place being filled to a certain extent by the genus *Gyna*, though this too is poorly represented both in numbers of species and individuals in the Kilimandjaro and Abyssinian regions. *Polyphaga* is a characteristically dry-country genus, its absence from Dr. SJÖSTEDT's collection is therefore not surprising; in Abyssinia, Somaliland and South Africa it is well represented. South Africa may be regarded as the head-quarters of the family *Perisphaeriidae* and such genera as *Aptera*, *Pronaonota*, *Pilema*, *Melanoblatta*, *Hostilia*, *Pæciloblatta* and others are peculiar to this region and include some of the most abundant species; in the Kilimandjaro region this sub-family is represented by four genera and six species only, two of the species being represented in Dr. SJÖSTEDT's collection by a good number of individuals, nearly all of the female sex, still it cannot be said that this sub-family is dominant in this region. The most dominant species of the Kilimandjaro fauna, as evidenced by the number of individuals captured, are the species of the genera *Pseudoderopeltis* and *Deropeltis*, and notably *P. petrophila* and *D. autraniana;* these were taken in great abundance at all seasons of the year and at varying altitudes and in a letter Dr. SJÖSTEDT informs me that many were found under the boulders bestrewing the Masai steppe-country.

The discovery of a cockroach symbiotic with termites is of much interest and that this species should be strictly congeneric with a species found in the nest of a social wasp in S. America is a fact that can scarcely be explained on any other supposition than that further collecting will reveal the wide spread distribution of the genus thoughout the tropics.

PLATE 2.

Plate 2.

Fig. 1. *Holocampra æthiopica* SHELF. n. sp. ♀.
2. *Ceratinoptera perpulchra* SHELF. n. sp. ♀.
3. *Apteroblatta perplexa* SHELF. n. sp. ♂.
4. *Carroblatta pulchra* SHELF. n. sp. ♂.
5. *Pseudoderopeltis petrophila* SHELF. n. sp. ♀.
6. » ♀ from the side.
7. *Paramethana robusta* SHELF. n. sp. ♀.
8. *Paraspheria marmorata* SHELF. n. sp. ♀.
9. *Pseudoderopeltis fulvornata* SHELF. n. sp. ♂.
10. *Anacompsa cucullata* SHELF. n. sp., wing.
11. » » » , tegmen.
12. *Temnopteryx ectobioides* SHELF. n. sp. ♂; apex of abdomen, ventral view.
13. *Apteroblatta perplexa* SHELF. n. sp. ♂; » » » » , » »
14. *Phyllodromia testacea* SHELF. n. sp. ♂; » » » » , dorsal »

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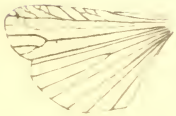

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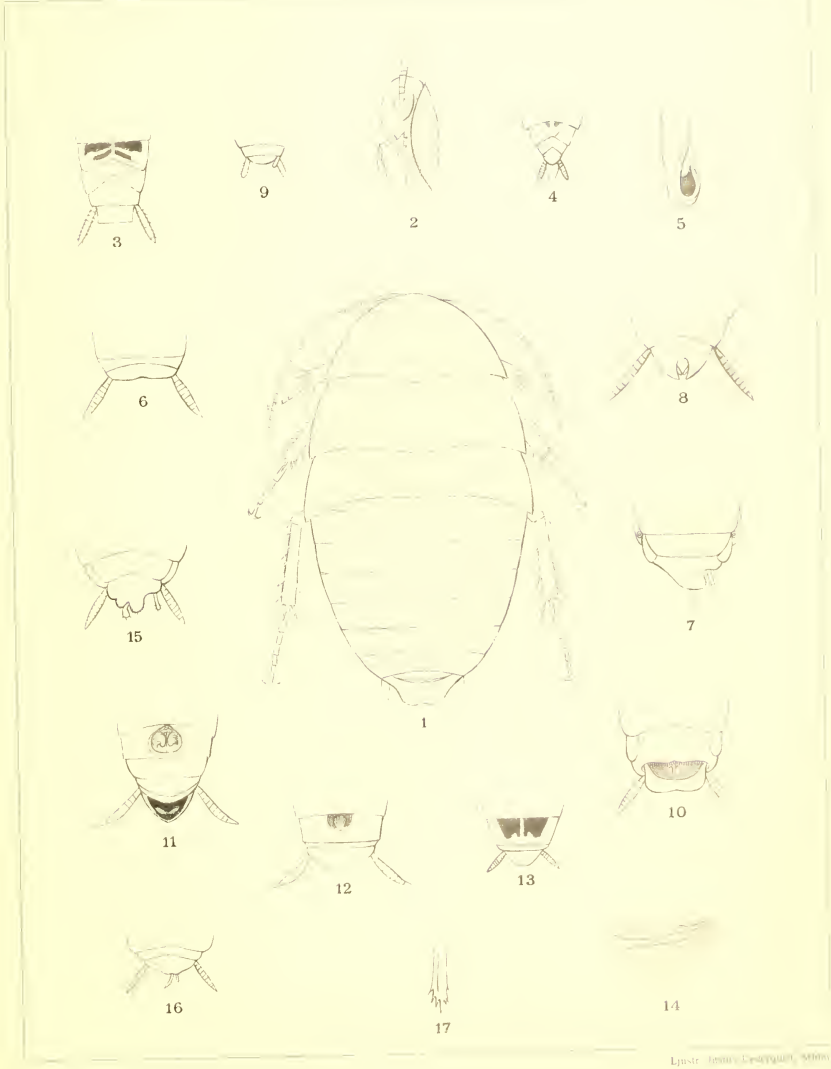
PLATE 3.

Plate 3.

Fig. 1. *Sphecophila termitium* Shelf n. sp. ♂; Lg 7,1 mm.
» 2. » » » » ♂; side view of head.
» 3. *Mallotoblatta kraussi* Adel. ♂; apex of abdomen, dorsal view.
» 4. *Hololampra æthiopica* Shelf. n. sp. ♂; apex of abdomen, dorsal view.
» 5. » » » ♂; titillator of penis.
» 6. *Ischnoptera incuriosa* Sauss. ♂; apex of abdomen, dorsal view.
» 7. » » » ♂; » » » , ventral view.
» 8. *Phyllodromia insignis* Shelf. n. sp. ♂; apex of abdomen, ventral view.
» 9. *Anacompsa cucullata* Shelf. n. sp. ♂; apex of abdomen, ventral view.
» 10. *Ischnoptera bimaculata* Gerst. ♂; apex of abdomen; dorsal view.
» 11. *Phyllodromia supellectilium* Serv. ♂; apex of abdomen, dorsal view.
» 12. » *nigromarginata* Shelf. n. sp. ♂; apex of abdomen, dorsal view.
» 13. *Ceratinoptera perpulchra* Shelf. n. sp. ♂; apex of abdomen, dorsal view.
» 14. *Hololampra æthiopica.* ♂; wing.
» 15. *Ischnoptera bimaculata* Gerst. ♂; apex of abdomen, ventral view.
» 16. *Ceratinoptera sjöstedti* Shelf. n. sp. ♂; apex of abdomen, ventral view.
» 17. » » » ♂; titillator of penis.



Auctor del

Ljustr. Jenny Cederquist, Stockh.

Shelford: Blattodea.